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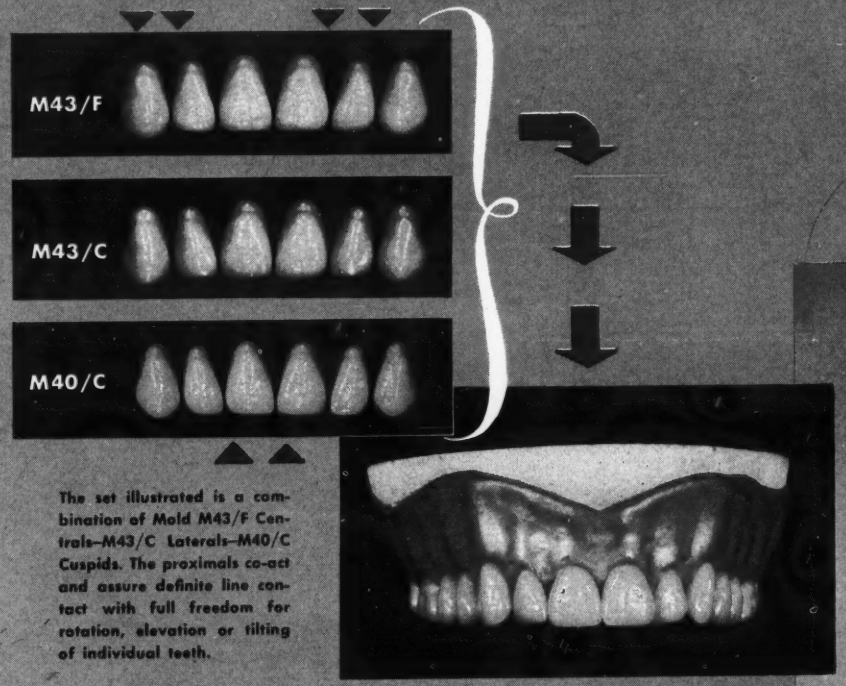

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About Our CONTRIBUTORS

JACK F. CATHCART, D.D.S. (University of California, College of Dentistry, 1926) who emphasizes prosthetics in his practice, particularly crown and bridge construction, is a frequent contributor to DIGEST having published numerous articles on technical subjects of special interest to dentists. In the current issue Doctor Cathcart's timely article, MOUTH PROTECTORS FOR CONTACT SPORTS, describes a protective mouth guard to be worn by those engaged in a strenuous type of sports or games.

T. S. MALSON, D.D.S. (Western Reserve University, School of Dentistry, 1923) presents in this issue a step-by-step description of an important technique, RECORDING AND TRANSFERRING MANDIBULAR MOVEMENTS.

HERBERT PASKOW, B.A. (University of Pennsylvania, 1943); D.D.S. (Thomas W. Evans Dental Institute, University of Pennsylvania, 1945); Certificate of Qualified Orthodontics (Columbia University, 1948) has contributed several articles to the dental literature, winning the ORAL HYGIENE award in March, 1951. For his first appearance in DENTAL DIGEST Doctor Paskow publishes ORTHODONTIC EXTRACTIONS.

Most of the illustrations in the third and final installment of Doctor Balint J. Orban's article, BIOLOGIC PRINCIPLES IN PERIODONTICS, which appears in this issue are from the book by Bernard Gottlieb and Balint J. Orban, *Tissue Changes Due to Excessive Stresses*, G. Thieme, Leipzig, 1931. Others were reproduced from the paper by Doctor Orban, *Traumatic Occlusion and Gum Inflammation*, in the *Journal of Periodontics*, October, 1939. Others are new.

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MOUTH PROTECTORS

for Contact Sports

JACK F. CATHCART, D.D.S., Berkeley, California

DIGEST

In the past mouthpieces were commonly thought of as a boxer's accessory to protect his lips and teeth from injury. However, a mouth protector is important for the participant in any sport in which there is the possibility of hard body contact.

Football, because of its popularity and roughness, is outstanding among contact sports. A mouth guard is also a protective device for (1) the basketball player, (2) ice hockey, or (3) for automobile racing drivers.

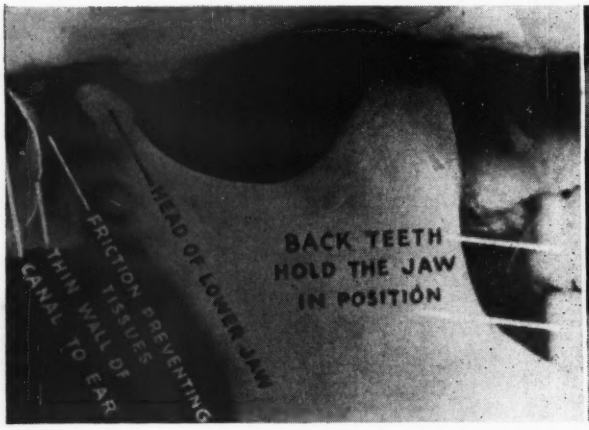
The illustrations in this article present a simplified technique for constructing an accurate mouth guard.

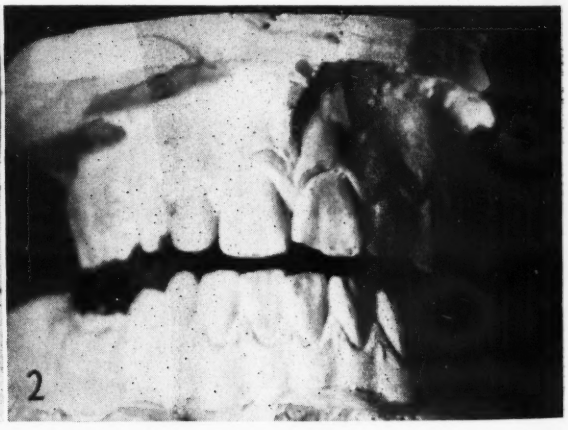
The Result of Shock from a Blow

A hard blow on the mandible transmitted by the condyle to the base of the brain brings about the shock known as the knockout. This shock is, to a great extent, taken up by the teeth, leading to their subsequent chipping or loss and the possibility of macerated lips and tongue.

Protective Check of the Condyle

If any, or all, of the posterior teeth are missing, the protective check of the condyle to its backward displacement is destroyed, leaving the subject in the extremely dangerous situation of a possible brain concussion or internal brain hemorrhage should he receive a severe blow on the mandible.

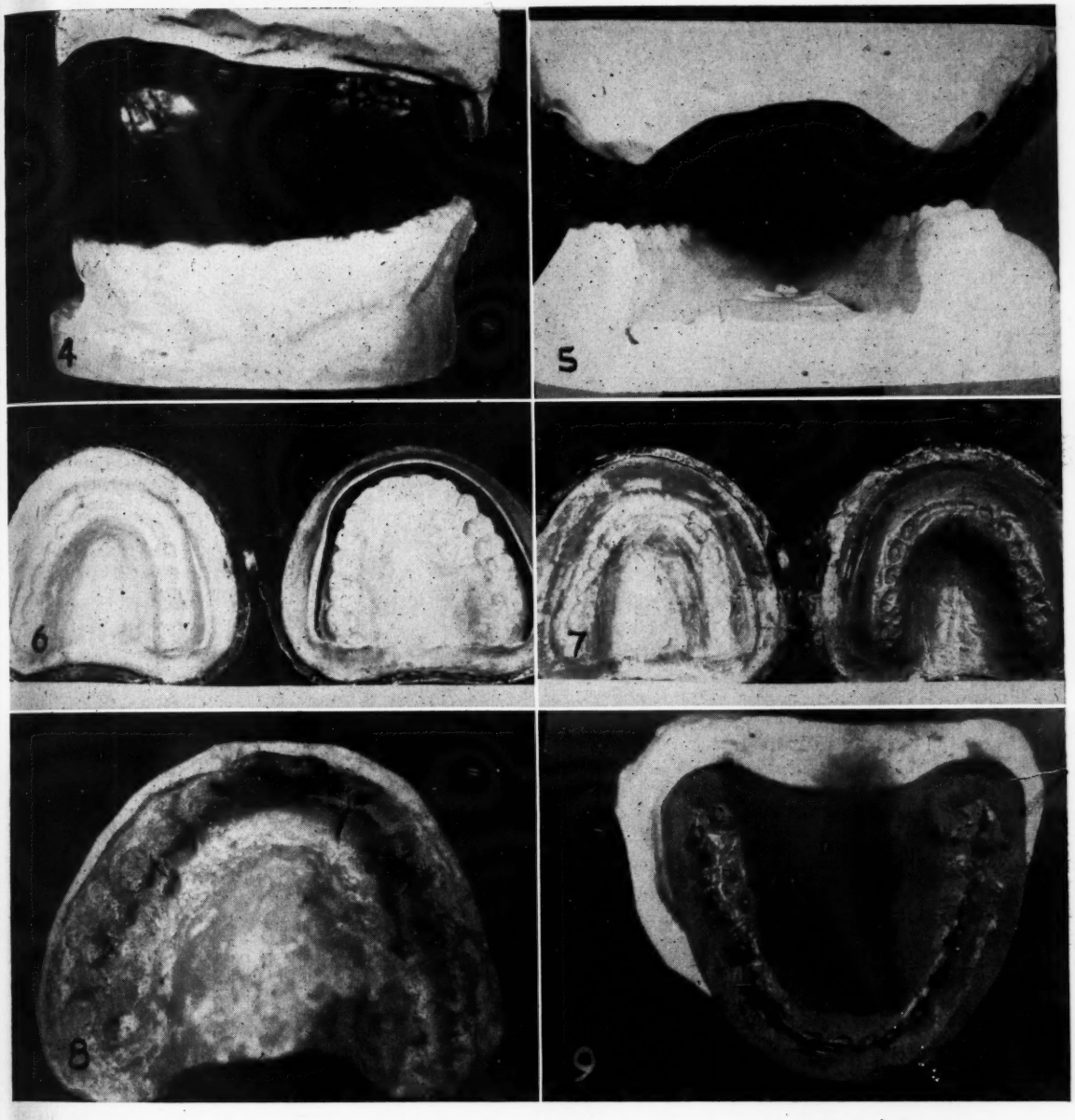




1. *Relation of the condyle to base of skull. Posterior teeth hold the jaw in position. Loss of these teeth and a severe blow on the mandible can cause serious trauma in this area.*

2. *An incisor broken by a blow. Upper and lower stone models set to show the approximate space necessary to allow enough bulk of mouthpiece material to take up the force of a blow and not bite through (approximately 5-8 millimeters). These models may be mounted on an articulator set to hold them open in this position.*

3. *Impression is made in hydrocolloid.*



4. *Wax is modeled over the upper model to form the shape of the mouthpiece which is 2 millimeters thick in palate area; 3 to 5 millimeters thick in labial and buccal area; 5 to 8 millimeters thick in occlusal area; and 2 millimeters lapping over lower teeth.*

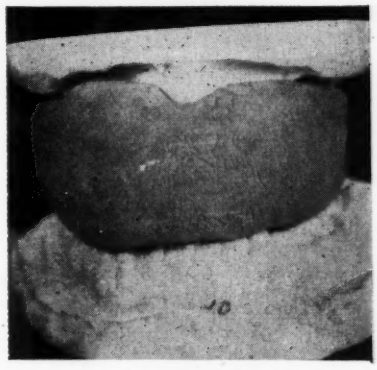
5. *Lingual view showing how palate area is molded to allow room for proper breathing and tongue space.*

6. *The case is invested in a two-piece vulcanite or acrylic flask in plaster (in the same manner as a vulcanite or acrylic denture) to be processed and the wax boiled out. It is not necessary to use tin foil if a plaster glazing solution is painted on the model side while still hot immediately following the boil-out.*

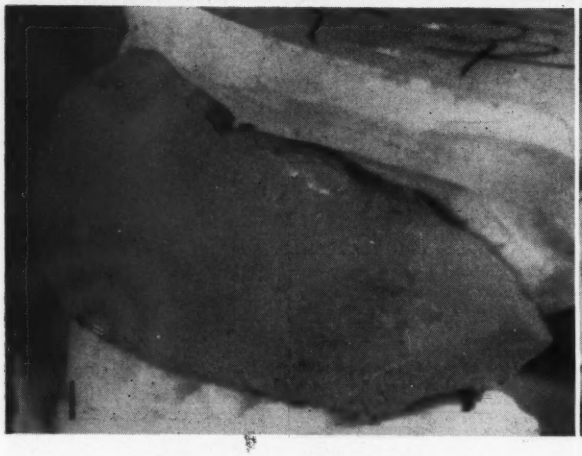
7. *Hot steamed velum rubber is placed around the teeth and model which should also be hot. A wet thick cellophane sheet is used as a separating medium between the two parts of the flask. The flask is pressed together in boiling water using a screw type press. It is then opened for test to be sure enough material has been used. Standard vulcanite technique is used. One and one-half hours at 320° Fahrenheit is the correct processing time.*

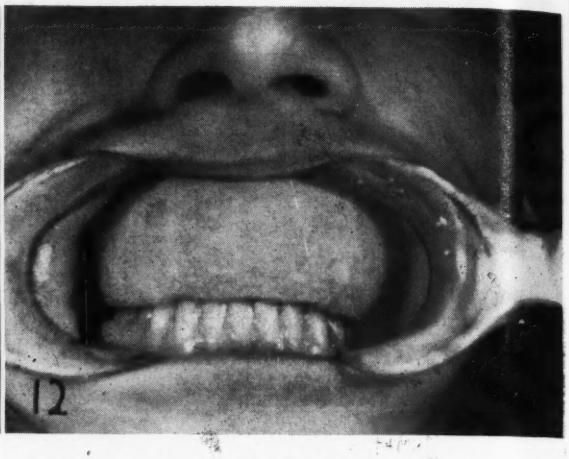
8. *Velum or soft rubber mouthpiece after cleaning from the flask, trimmed, and buffed to proper contour.*

9. *Finished mouthpiece replaced on the model.*



10. *Front view of finished mouthpiece with lower set in place.*





11. ***Side view of finished mouthpiece, showing relationship to lower cast.***

12. ***Mouthpiece in position in player's mouth.***

13. ***Mouthpiece or mouth protector worn in action.***

Mouth Guards Required for Professionals—The danger is recognized in professional boxing and some state boxing commissioners insist that the fighters under their jurisdiction wear properly fitted mouth guards before being allowed to fight.

Injuries in Amateur Sports—Little thought is given, however, to the amateur athlete engaged in any of the body contact sports who is far more vulnerable to injury than the professional. Frequent headlines are: High School Boy Dies From Football Injury, or College Basketball Player Still Unconscious From Game Injury. A great many serious injuries could be prevented as well as the loss of teeth or injury to teeth and lips.

Construction of a Mouth Guard

1. The mouth guard must be constructed of some soft material which will give or take up the shock and still be tough so that under a hard blow the wearer cannot bite through it. Velum rubber is the material that, so far, has proved best suited for mouth guards. Non-hardening plastics such as those used in facial prosthetics (ears and nose) are too soft and can be bitten through.

2. The mouth guard should be made to fit the person who is to wear it as accurately as a denture would be constructed to fit. A poorly fitting mouth guard is a constant source of annoyance to the wearer as his attempts to keep it in position distract his attention from his activities. A fighter is frequently knocked out while trying to get his mouthpiece back into position.

3. The mouth guard should also be so constructed that breathing is not interfered with; and so that it will not be displaced or gag the wearer if the mouth is kept open under great stress with insufficient air entering the lungs through the nose.

4. Accuracy of fit is the answer to the problem, with the occlusal surface formed to occlude with the opposing mandibular teeth.

701 *American Trust Building.*

Recording and Transferring

MANDIBULAR MOVEMENTS

T. S. MALSON, D.D.S., Cleveland

DIGEST

The answer to the question frequently asked, "What is the most important step in full denture construction?" is that there is no* most important step. *Each step is of equal importance; a false or careless step in procedure will jeopardize the success of the dentures.

The method outlined in this article for recording and transferring mandibular movements has been used by the author for twenty years and to date not once has it been necessary to change a posterior tooth at the try-in.

Technique

In recording and transferring the movement of the mandible for the purpose of constructing dentures it is highly important to use baseplates that fit both the maxilla and the mandible in the same manner as the completed dentures.

Any sound impression technique that will result in accurate casts of the surface tissues to be covered on the maxilla and mandible may be followed.

Baseplate Materials—1. In the method known as the double vulcanite or the double acrylic technique, the baseplates are constructed of vulcanite or acrylic and should be accurate reproductions of the base of the finished dentures.

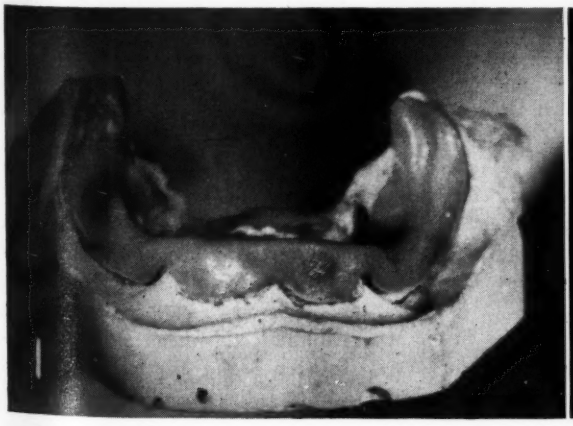
2. If the base is to be constructed of one of the hard wax baseplate materials, one should be selected that will hold its form after it is molded. The hard wax baseplate must be an accurate fit and should be stabilized by a thin lining of zinc oxide impression material or one of the self-curing acrylic materials.

Bite-block Materials—Using a satisfactory compound rather than wax, bite-blocks are built on the accurately fitting baseplates. The reasons for constructing bite-blocks of compound are the following: (1) Wax will drag, (2) will not accurately reproduce the necessary recording, and (3) wax is much more susceptible to the temperature change.

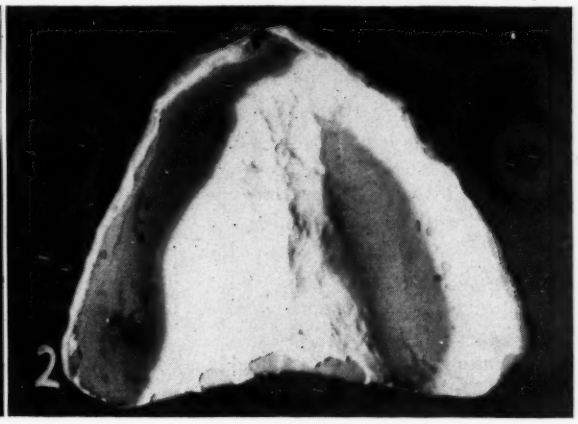
When the baseplates and compound bite-blocks have been constructed, the patient is recalled and the lower denture is placed in the mouth. The compound is trimmed to the height of the lower six anterior teeth and the labial contour is established.

Establishment of the Occlusal Plane—The lower cast is a much more reliable guide than any other part of the mouth for establishment of the occlusal plane. The landmark used is the retromolar pad. Careful examination of any natural dentition where the lower natural teeth are present

1. ***The baseplate must fit the cast.***



2. ***Zinc oxide impression paste lining in baseplate to stabilize.***



3A, 3B, and 3C. ***Relation of retromolar pad to second and third molar at different ages: 19, 49, 61.***

will reveal that the height of the distal cusp of the last tooth present (either third or second molar) is about one quarter of the distance from the top to the bottom of the retromolar pad. For this reason one quarter of the distance from the top of the retromolar pad is accepted as the distal end of the occlusal plane. For the height of the anterior end of the occlusal plane the height of the compound bite-block as carved in the cuspid areas is accepted.

The Compensating Curve—With these two points as the height of the occlusal plane, the next step is to establish the approximate compensating curve or so-called Curve of Spee. The landmarks that are present on the lower case are used. The records of former measurements are present in every mouth but this fact is not always taken into consideration.

The x-ray records of natural teeth demonstrate that the crest of the mandibular bone closely parallels the occlusal curvature of the height of the cusps of the lower teeth from the distal cusp of the second molar to the cuspid.

Evidence of Trauma—It is reasonable to believe that if all of the lower teeth were extracted at one time and the ridge permitted to heal normally, the same curvature would be present. In many cases the teeth are lost one or two at a time and evidence of injury or loss of bone due to extraction or other causes is present.

Loss of bone must therefore be taken into consideration in estimating the curve. Because of the width of the mandible in the molar region, bone loss is usually less and curve change in this area is therefore slighter.

Estimating the Arc—1. Roughly divide the distance from the cuspid to the bottom of the retromolar pad in fifths. 2. As it is thought that there is less curve change in the distal or molar area the curve or arc found in the distal fifth is acceptable. This arc is projected from the distal end of the occlusal plane which has been marked on the compound bite-block, to the cuspid area. 3. The compound is carved with a sharp knife or a rotary file.

The Curve Varies—The lower compound bite-block is carved to approximate the curve found on the distal fifth of the ridge on the right and left sides. The author has applied this principle in innumerable cases and has never found the curve to be exactly the same on both sides.

Reproducing the Curve—1. When the carving or forming of the curve of the lower bite-block is completed, lay it aside and place the upper base and compound bite-block in position. Establish the contemplated length of the upper anterior teeth and contour the labial surface of the compound for lip contour.

2. Chill, and place the lower baseplate and carved compound bite-block. The compound in the bicuspid and molar area of the upper bite-block is softened, placed in the mouth, and the patient is asked to close with as much force as possible. As the compound chills or hardens rather rapidly, it may be necessary to repeat the softening two or three times before the anterior hardened areas are in contact.

3. When the compound in the anterior region is in contact, the excess in the posterior region is removed and the height of the compound in the incisal area of the lower block is recorded on the lower cast. This is done by drilling a hole in the lower cast below the area for the two centrals with a Number 1 round bur.

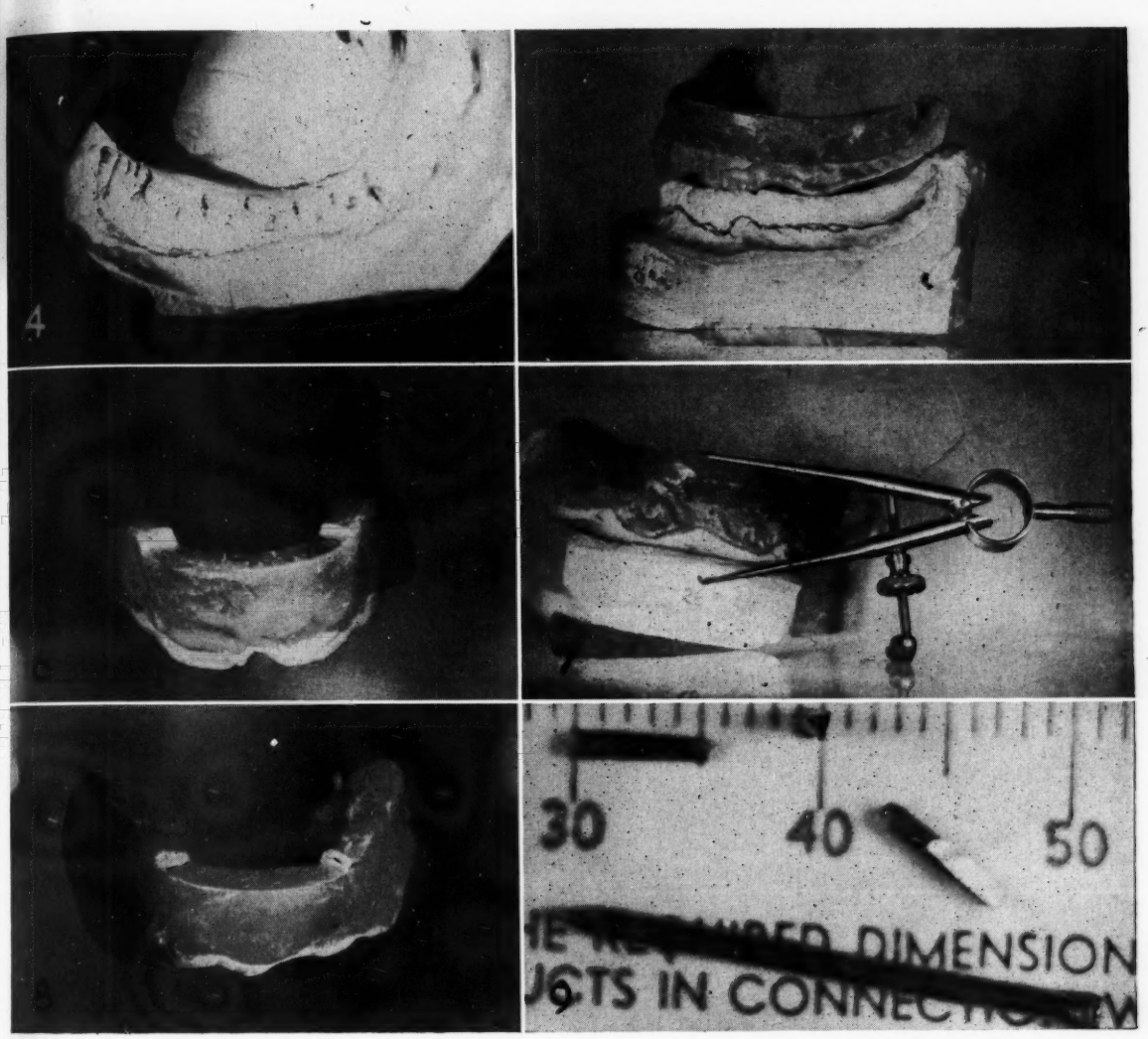
4. With a pair of calipers record the distance from the hole to the height of the compound block. This will later provide a record of the height of the lower incisors.

5. Replace the bite-block in the patient's mouth and determine the correct vertical dimension.

Procedure—Following the procedure to this point (establishing with the compound bite-blocks the height of the upper and lower incisor teeth) it is apparent that the patient would have had an end-to-end bite for the result to be correct vertical dimension. The height of the compound must be reduced to obtain the correct vertical dimension for the patient who does not have an end-to-end bite. This is the reason for recording the height of the anterior teeth on the lower cast. All compound removed, it is taken from the lower bite-block.

Basic Theory—The method described for establishing the correct vertical dimension is based on the theory that rest position is retained throughout life whether teeth are present or not. Rest position is described as that position in which the elevator and the depressor muscles are in equilibrium.

Steps to be Taken—1. The rest position is used as a guide in establishing the correct vertical. It was discovered in several hundred cases that the freeway space, or the distance between the rest position and the natural teeth when in contact, was between 3 and 3¼ millimeters. The patient is therefore told to assume the



4. *Divide retromolar pad in four sections. Divide ridge from base of retromolar pad in five sections.*

5. *Carve lower compound bite-block to approximate curve of lower cast.*

6. *Carve compound of upper bite-block in anterior for length of upper anterior teeth.*

7. *Record height of lower anterior teeth on cast.*

8. *Remove sufficient compound from lower bite-block to establish correct vertical dimension.*

9. *Eighteen-gauge wire nail cut and ground on three sides to form a triangle.*

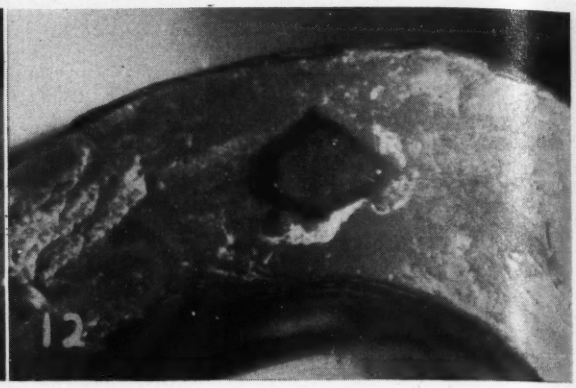
rest position which is the position in which the lower jaw feels most comfortable. This can be checked by having the patient repeat the letter M. When there is a space of 3 or 3¼ millimeters between the compound bite-blocks it is assumed that the correct vertical is obtained.

2. The patient is requested to close and swallow. If the patient cannot swallow easily, surface flame the lower compound bite-block, place it, and have the patient close and swallow quickly. The accuracy of this procedure may be tested by closing the teeth and swallowing. Place a toothpick or other thin object between the teeth and swallow. While there is little difference in the vertical dimension, there will be noted quite a difference in the ability to swallow easily. When the position in which the patient can swallow easily is determined, this position is accepted as the correct vertical dimension and centric relation can be established.

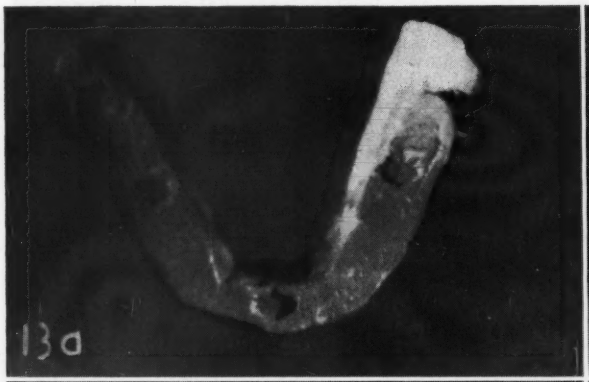
Anterior-Posterior and Lateral Curves—The anterior-posterior curve

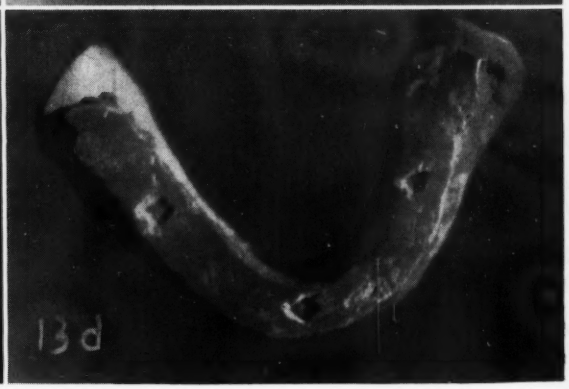
10. *Triangular nails set for recording mandibular movement.*

11. *Secondary angle after checking centric.*



12. *Secondary angle eliminated by further movements.*





13A, 13B, 13C, and 13D. **Various types of records of mandibular movements.**

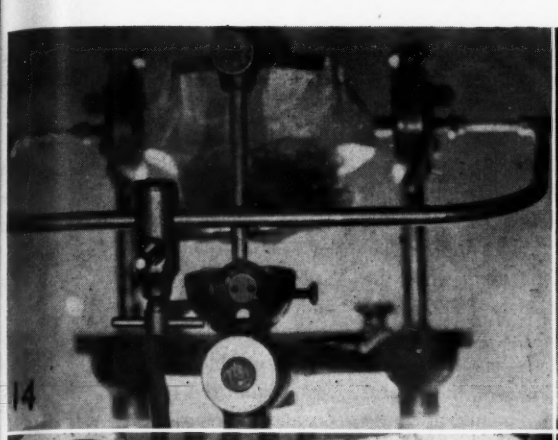
has already been approximated by carving the compound. The following steps may now be taken: 1. Hold the finger over the central area of the upper bite-block and quickly surface flame the rest of the upper compound bite-block, place in position, and have the patient make right and left lateral movements.

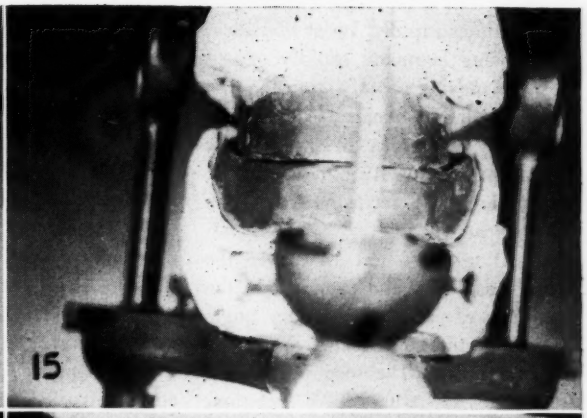
2. Chill the upper and repeat the same procedure with the lower bite-block. Chill, and replace the lower.

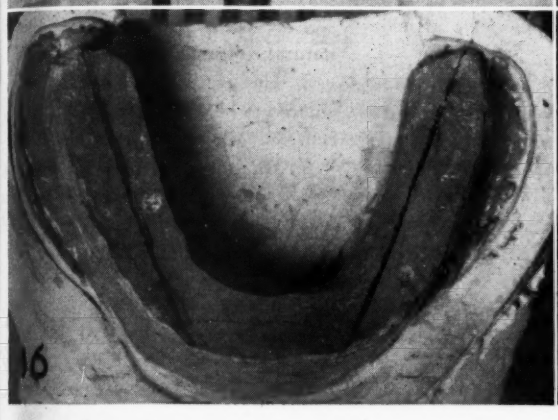
3. Remove the upper, hold a finger or fingers over the second bicuspid-first molar area, and quickly surface flame the central and the right and left second molar areas. Replace, and have the patient protrude and retrude quickly.

This method should establish the anterior-posterior and lateral curves so that the patient can move the mandible in all directions with ease, and without disturbing the fit of either base.

Further Steps—1. Remove the upper base. In the anterior midline and on each side in the area between the second bicuspid and first molar, heat and imbed a triangular wire of about 18 gauge. A short piece of an iron wire finishing nail ground on three sides can be used to make a sharp triangular cutting surface. The wire is placed so that an angle points toward the anterior and so that it





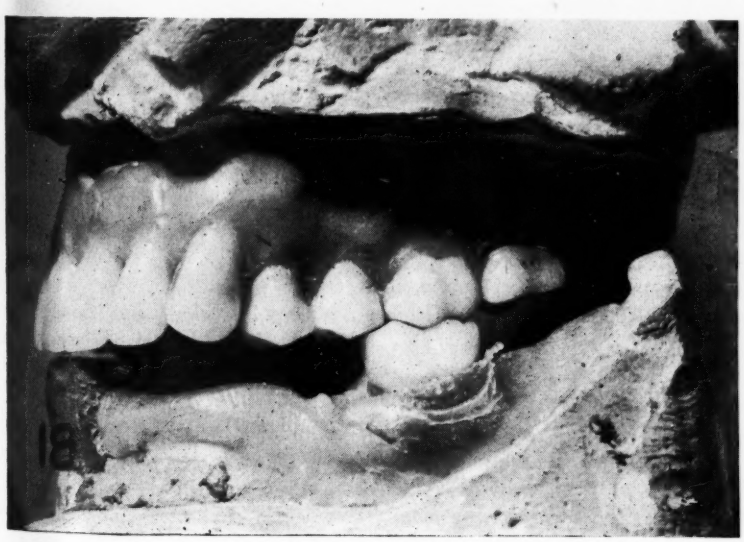


14. *Mount upper cast (face bow is advisable).*

15. *Mount lower cast.*

16. *Line drawn on lower bite-block over ridge from cuspid to center of retromolar pad.*

17. *Set upper teeth to lower bite-block.*



18. *Remove lower bite-block and set lower teeth to upper.*

protrudes about 1 millimeter above the surface of the compound bite-block. The excess compound is trimmed from around the wire triangle and the bite-block is chilled.

2. It is explained to the patient that the bite-blocks will not be in contact when they are first placed in the mouth. By moving the lower jaw carefully at first the three triangular wires will cut their way into the lower compound bite-block and record the movements of the mandible.

3. When the bite-blocks are in contact and the patient can move the mandible freely in all directions, remove and dry the lower base-plate and bite-block.

4. In the majority of cases three sharp angles will be found in the lower bite-block pointing toward the anterior. The form of the carvings distal to the angle will vary greatly. The anterior angles recorded may or may not be true centric. In the majority of cases the acquired centric is represented which has no doubt been caused by gradual loss of teeth or by habit.

Test for True Centric—Replace the lower baseplate and test for true centric as follows: 1. Have the patient protrude and retrude about ten or

twelve times rapidly. Insist that these movements be made rapidly.

2. In moving rapidly, after the first two or three movements it will be necessary to return to true centric before protruding. In moving slowly, protrusion or retrusion may be stopped at will.

3. After this test, remove the lower base, dry, and examine. In the majority of cases a secondary angle will be found carved anterior to the primary angle. The secondary angle represents the true centric relation, so the base is returned to the mouth and the patient requested to move more rapidly. The rapid movements soon tire the muscles and the secondary angle is obliterated.

When true centric is recorded a face bow registration is taken and the upper cast is mounted on the articulator.

Accuracy Ensured—When the upper mounting has set, place the triangular wires in the upper bite-block in the anterior angles recorded in the lower bite-block. This can be done by touch with a light pressure distally on the lower and anteriorly on the upper. The baseplates are sealed to the cast in the centric and the upper bite-block is sealed to the lower bite-block. This ensures accuracy which cannot be done when the bite-blocks are sealed together in the mouth.

The lower cast is mounted, and when the plaster has set, the lateral and protrusive movements are registered and recorded on the articulator.

Final Steps—The upper compound is removed and the upper teeth are set to the curve recorded on the lower compound bite-block. The teeth are set in a hard set-up wax. When the wax has thoroughly set and the buccal and lingual cusps of the posterior teeth are in contact with the compound, remove the compound from the lower baseplate and position the lower teeth to articulate with the upper teeth.

Conclusion

It is the author's belief that the successful results obtained in the use of the described technique are based on the following factors:

1. Bases are established that fit and are stable.
2. A comfortable vertical dimension is established.
3. Equalized pressure is secured on all ridge surfaces.
4. A compensating curve that is natural to the patient is adopted.
5. The procedure described is considered to be a positive check for true centric.
6. The material used is one that will record mandibular movements and that can be accurately transferred to the articulator.

1038 *Keith Building.*

Dental Meeting Dates

Pennsylvania State Dental Association meeting in conjunction with the Greater Pittsburgh meeting, Pittsburgh, September 11-14.

Georgia State Dental Society, annual meeting, Atlanta, September 23-26.

New England Dental Society, annual meeting, Boston, September 26-27.

Idaho State Dental Society, annual meeting, Lewiston, September 27-29.

Colorado State Dental Association, annual meeting, Colorado Springs, October 1-4.

American Association of Dental Examiners, regular meeting, Washington, D.C., October 12-13.

American Dental Association, annual meeting, Washington, D.C., October 15-18.

American Dental Assistants Association, annual meeting, Washington, D.C., October 15-18.

American Public Health Association, regular meeting, San Francisco, October 29-November 2.

New Orleans Dental Conference of the New Orleans Dental Association, annual meeting, New Orleans, November 11-14.

Midcontinental Dental Congress of the St. Louis Dental Society, annual meeting, St. Louis, November 25-28.

Ohio State Dental Association, annual meeting, Cleveland, November 25-28.

ORTHODONTIC *Extractions*

HERBERT PASKOW, B.A., D.D.S., Elizabeth, N. J.

DIGEST

If the final result is to be stable, esthetic, and functionally efficient, the removal of teeth is a necessity in the orthodontic treatment in certain cases.

This procedure may appear radical but it is more desirable than to attempt to correct cases of the types described herein by so-called conservative treatment with expansion arches. With the use of appliances of any description results will be consistently unsatisfactory, for orthodontic appliances cannot, as previously thought, grow basal bone. They may possibly encourage such growth, and probably aid in its retardation when that is desired but actual stimulation of bone growth by appliances is doubtful.

Three reports of cases in which judicious extraction is demonstrated to have had completely satisfactory results are illustrated.

Indications for Orthodontic Extractions

Reference to old publications and textbooks reveal that the removal of teeth in conjunction with orthodontic appliance manipulation is not a recent concept; the procedure was successfully practiced many years ago.[1,2]

Evolutionary Tendencies—The progressive trend toward a more orthognathic profile appears to support the extraction technique. Because nature has failed to eliminate the number of dental units, or decrease the size of teeth as rapidly as the bony structure of the face has diminished in the evolutionary process, extractions, when specifically indicated, are justified.

Congenitally Missing Teeth Will Become a Normal Occurrence—In time, congenitally missing third molars, lateral incisors, or second biscupids will probably be a more common and normal occurrence than the abnormality of their absence today.[3] Until that time orthodontists must help to compensate for nature's inadequacy. In cases of extreme crowding, especially in the anterior parts of the dentition, where there is a past history of normal growth and development, orthodontic intervention is indicated.

Factors to be Considered—Constitutional, local, and hereditary factors must also be carefully considered prior to treatment planning.[3,4,5] The possibility of inheriting the tooth size of one parent and the jaw size of the other is still a controversial issue among geneticists.

Problem of Premature Loss of Teeth—Occasionally, premature loss of deciduous molars has been followed by migration of permanent teeth into the space provided for a now blocked-out bicuspid. Such cases must be carefully scrutinized to determine the possibility of repositioning the offending units in order to provide sufficient room anteroposteriorly for the blocked-out teeth.

Preventing Complications—If anterior bone growth has been impaired by premature loss, an attempt to provide space and maintain the full tooth complement will usually invite impaction of third molars and/or relapse. The prevention of such complications can usually be accomplished by employing space maintainers immediately after the loss of a deciduous molar.[6]

Recognizing an Extraction Case

Many cases of malocclusion can be recognized soon after the eruption of the permanent centrals and lateral incisors. Little, if any, further lateral or anterior growth mesial to the first permanent molars occurs after the developmental period.[7,8,9,10] Crowding or marked procumbency can often be foreseen at this time. However, observation is the safest procedure until the approximate age of 12 or 13.

Preventive Orthodontic Measures Recommended—A few leading clinical orthodontists have advocated such preventive orthodontic measures as the removal of permanent tooth buds (four first bicuspid tooth buds) as soon as such a malocclusion is suspected.[11] If this practice proves both clinically and scientifically suc-

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[1]Case, Calvin S.: Facial and Oral Deformities (1896), Dental Orthopedia, Chicago, C. S. Case Co., 1921.
[2]Grieve, George W.: Manifest Evidence of the Cause of Relapse in Many Treated Cases of Malocclusion, Int. J. Orth. & Oral Surg. **23**:23-24 (Jan.) 1937.
[3]Colin, Edward C.: Elements of Genetics, Philadelphia, The Blakiston Co., 1947.
[4]Salzmann. J. A.: Principles of Orthodontics, Philadelphia, J. B. Lippincott Co., 1943, pp. 320-385.
[5]Paskow, H.: Orthodontic Diagnosis Questionnaire, Am. J. Orthodontics **36**:451-453 (June) 1950.
[6]Callaway, G. S.: Contraindications for Space Maintainers in Children's Mouths, J.A.D.A. **27**:10-54 (Jan.) 1940.
[7]Hellman, Milo: Development of the Face and Dentition and Its Application to Orthodontic Treatment, Am. J. Orthodontics **26**:424-447 (June) 1940.
[8]Krogman, W. M.: Facing Facts of Face Growth, Am. J. Orthodont **25**:724 (Aug.) 1939.
[9]Brodie, Allan G.: On the Growth Pattern of the Human Head from the Third Month to the Eighth Year of Life, Am. J. Anat. **68**:209-262 (Mar.) 1941.
[10]Salzmann, J. A.: Principles of Orthodontics, ed. 2, Philadelphia, J. B. Lippincott Co., 1943, pp. 78-149.
[11]Tweed, Charles H.: Evolutionary Trends in Orthodontia, Past, Present, and Future. Meeting before Northeastern Society of Orthodontists, November 29, 1949.

cessful, another milestone in preventive dentistry will have been reached.

Cases Warranting Removal of Several Teeth—Both types of bimaxillary protrusion cases warranting the removal of two or four teeth have been accurately described: (A) Crowding in anterior segments showing a normal to hypertoned lip musculature, and (B) little crowding, but marked procumbency of anteriors with flabby hypotoned lips and prognathic profile.[12]

1A. and 1B. ***Case 1. Before and after treatment.***

2A. and 2B. ***Case 2. Before and after treatment.***

3A. and 3B. ***Case 3. Before and after treatment.***

Both types of cases ordinarily warrant orthodontic treatment (1) for esthetic improvement, and (2) for greater functional efficiency and longevity of all teeth concerned since teeth that are located off their bony bases are more susceptible to periodontal invasion.[14]

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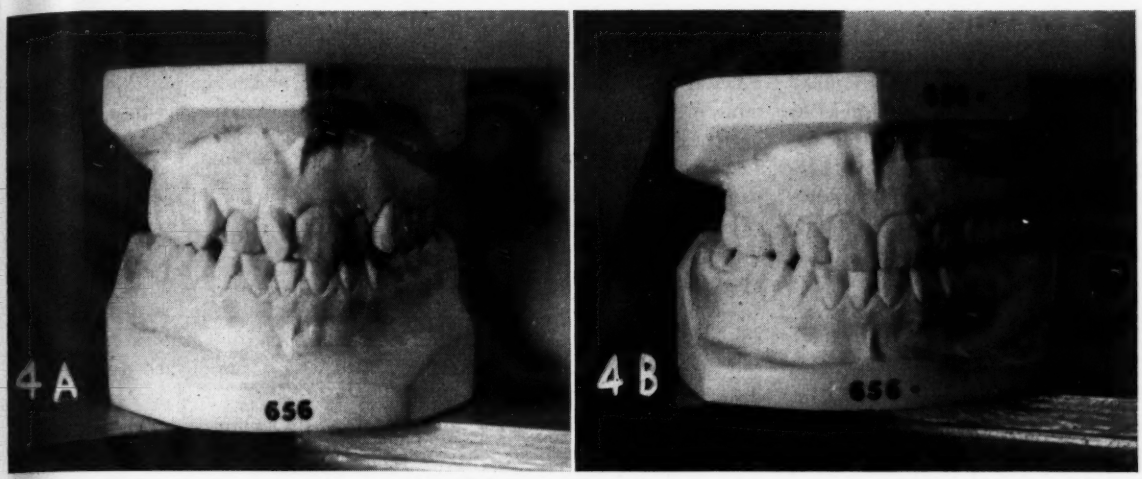
[12]Strang, R. H. W.: Textbook of Orthodontia, ed. 2, Philadelphia, Lea & Febiger, 1943.
[13]Paskow, H.: Practice Preventive Orthodontics, Dental Survey **26**:35-39 (Jan.) 1950.
[14]Prinz, H., and Greenbaum, S. S.: Diseases of the Mouth and Their Treatment, ed. 2, Philadelphia, Lea & Febiger, 1942, pp. 126-245.



4A. and 4B. *Models of Case 2 before and after treatment.*

Indications for Treatment

Until clinical and theoretical evidence is furnished to support the tooth-bud removal practice mentioned, the best procedure is merely to observe the case in the mixed dentition stage:

1. When all deciduous teeth have been exfoliated and permanent teeth, with the exception of third molars, have erupted to their individual limitations (ages 11 to 14) orthodontic intervention must be seriously considered.[13]

2. Bands are usually placed prior to the removal of the indicated teeth to prevent undesirable forward migration of posterior teeth. The object is to maintain the positions of the posteriors, and reposition posteriorly all the anteriors, meanwhile correcting existing rotations, occlusal disharmonies, and buccolinguo-mesiodisto versions.

Adult Cooperation of Value—Adult cases may also be completed within the usual two-year period of active treatment because of the normally greater cooperative interest on the part of an adult. If bony breakdown has already occurred, the benefits of intervention are questionable and if atrophy is extensive orthodontics are definitely contraindicated.

Diagnostic Problem—The so-called borderline cases present a greater diagnostic problem to the practitioner (Case 3 as compared to Case 1). The serious offense of promiscuous extraction in debatable cases must be carefully considered. It is often advisable to attempt conservative treatment by attempting distal movement first; then, if necessary, resort to tooth removal (Case 3). It is not implied that most cases are best treated by the removal of dental units, for each case of malocclusion is an individual problem and must be studied and treated as such.

Which Teeth to Extract

To achieve the most satisfactory results possible in the shortest length of time the following factors must be considered: 1. The teeth chosen to be removed in most cases requiring extractions are the first bicuspids. 2. Cuspids are rarely, if ever, sacrificed, no matter what degree of severity is displayed by the malocclusion. 3. If the first bicuspids are comparatively healthy while second bicuspids, or first molars, are carious or restored with large replacements, their removal must be considered, and additional treatment time allowed for. 4. Occasionally, the removal of maxillary first bicuspids and mandibular

5. ***Edgewise appliance used in an extraction case. As a rule it is necessary to employ a multiband technique in treating extraction cases of this nature. Within certain limits this technique aids greatly in the accomplishment of all desired tooth movements.***

second bicuspids is indicated. 5. Frequently in adults, the removal of one or both maxillary (or mandibular) first bicuspids only is advisable to bring about a pleasing result in the shortest possible time (Case 2). However, the author is inclined to favor the four-tooth extraction technique in preference to the two in *all* such cases.

Case Reports

Cases 1 *and* 2— *Two maxillary first* bicuspid extraction cases no longer under retention. Despite the loss of these two teeth, a better occlusion of the remaining teeth has been attained with additional occlusal equilibration. Aside from the esthetic improvement, a better functional efficiency was obtained with, no doubt, increased longevity. The patient in Case 1 was age 12 when treatment was instituted. The patient in Case 2 was age 22. Both cases were completed within eighteen months and were retained for approximately six months.

Case 3— An extraction case. However, the author considered it a so-called borderline case and attempted distal movement of both maxillary buccal segments. After ten months of occipital anchorage little progress was noted, and x-ray examination revealed the maxillary third molars were impacted. Removal of these was advised and accomplished, and identical treatment procedure was continued. The case was successfully terminated within the next eight months. This case could have been satisfactorily treated by removal of maxillary first bicuspids or even second molars when treatment was begun. Although the patient objected to wearing bands on the anteriors, successful termination was accomplished with the necessity of banding only the mandibular cuspids and all first molars.

1139 *East Jersey Street.*

Tumors of the Head and Neck

John R. McDonald, M.D., and Donald L. Alcott, M.D., Rochester

Congenital Anomalies

Cyst of the Thyroglossal Duct— The main portion of the thyroid gland develops as an evagination from the floor of the primitive pharynx in the region destined to become the base of the tongue. From this anlage there may persist the thyroglossal duct extending from the foramen caecum to the isthmus of the thyroid. Its usual fate is fibrous obliteration; however, it sometimes persists and portions may undergo cystic dilatation. It then presents itself as a round to oval midline tumor which is usually 5.0 centimeters or less in diameter. The duct is usually in close association with the hyoid bone and may even traverse the substance of the bone. Therefore, to prevent recurrence it is necessary to remove completely the cyst, the central portion of hyoid bone, and the tract of the cyst up to the base of the tongue.

Branchiogenic Cyst — Branchiogenic cysts develop as a result of failure of closure of the second or third branchial clefts. These cystic tumors present themselves usually in close relation to the sternocleidomastoid muscle. They may open externally or internally. They often fluctuate in size from time to time in relation to spontaneous drainage. They frequently become infected, with resultant fistula formation. Histologic study often reveals lymphoid tissue, sometimes with definite follicle formation, beneath the epithelium. This condition is not seen in cysts of the thyroglossal duct. Malignant lesions arising from these structures have been described. It has been suggested that these branchiogenic lesions should be treated surgically rather than by attempts to close the structures with sclerosing agents.

Cystadenoma Lymphomatosum—A rare tumor of the parotid region (Warthin's tumor). Its histogenesis is debatable. One theory is that it is of branchial origin; however, some investigators point out that the branchial pouches take no part in the formation of the parotid gland. The tumor usually occurs in the older age group (fifth, sixth, and seventh decades). It is benign, slowly growing, and found predominately in males. The microscopic picture of the typical lesion is characteristic. There are glandular cystic spaces lined by epithelium resembling that of the parotid tubules (1) cytologically, and (2) in that the cells are two layers thick. The stroma is of a lymphoid variety of varying quantities and may show marked hyperplasia, even to the formation of germinal centers. The treatment is surgical excision. They recur only if incompletely removed. This tumor is also somewhat radiosensitive.

Cystic Hygroma—A congenital tumor usually found in the region of the anterior triangle of the neck. It is occasionally seen in the thoracic wall or in the axilla. The growth may become quite bulky. Histologically the tumor is a lymphangioma. It tends to undergo spontaneous regression before adult life is reached and is also subject to repeated bouts of inflammation. These neoplasms are treated by irradiation.

Cancer of the Face—It is estimated that about 90 per cent of all carcinomas of the skin develop on the face and neck. In surgical clinics squamous-cell epithelioma are more frequent than the basal cell variety; however, in dermatology clinics the reverse is true. In general, squamous cell carcinomas are much more malignant than basal cell carcinomas, but some squamous cell tumors are slow growing and some basal cell carcinomas, especially those of the eyelids, may infiltrate rapidly.

Location: The location of the lesion is often helpful in distinguishing clinically between the two tumors, those on the eyelid and nose usually being of the basal cell variety. There exists a mixed group, that is, tumors containing both basal cell and

(*Continued on page* 375)

BIOLOGIC PRINCIPLES

in Periodontics – Part Three

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The manifold tissue changes that may occur from occlusal trauma, both in animal experimentation and in human tissue, are illustrated in this installment which is the final section of a three-part treatment of the subject of periodontal tissue changes due to occlusal trauma.

The results of histopathologic investigation of the subject are presented in detail and important factors involved in the maintenance of periodontal health are defined.

1. *Root of a dog's tooth. The tooth crown was tipped to the buccal side by a high crown. The apex moved to the lingual. The periodontal space is compressed on the labial margin and on the lingual of the apex. At the opposite sides the periodontal membrane is widened.*

Tissue Changes Due to Occlusal Trauma

In textbooks of recent date occlusal trauma is made responsible for the following conditions:

Traumatic crescents
Congestion of the marginal gingivae
Recession of the marginal gingival line
McCall's festoons
Stillman's clefts
Shortening of the crest of the septal gingivae
Absence of stippling
Increased depth of gingival sulcus
Epithelial nodules
Mobility of varying degrees
Various changes taking place in the alveolar bone
Gingivitis
Linear depression
Distended veins in the mucosa
Pus in the crevicular exudate
Widening of the periodontal space
Thickening of the lamina dura
Rarefaction
Condensation
Hypercementosis
Root resorption

Many other disturbances are said to be caused by occlusal trauma. It has even been claimed that occlusal trauma can produce disease that persists after the area becomes edentulous. None of this has been substantiated by experimental findings or other facts.

Investigation of Tissue Changes

Tissue changes having their origin in occlusal trauma have been thoroughly investigated by animal experimentation and by study of human autopsy material. The first group of slides shows the histopathologic results of occlusal trauma in dogs at time intervals of a few hours to over a year.

Figure 1—The distal root of an upper premolar of a dog. The tooth carried a high crown for thirty-six hours. Because of this occlusal interference (1) the crown of the tooth was pressed toward the buccal side, completely compressing the periodontal membrane between the surface of the root and the alveolar bone, (2) the periodontal membrane was also compressed on the lingual surface of the apex, due to tipping of the tooth, and (3) the two opposite sides of the tooth show a widening of the periodontal membrane.

Figure 2—An upper incisor which was ligated to an orthodontic wire for forty-eight hours. The compression and widening of the periodontal membrane are again obvious.

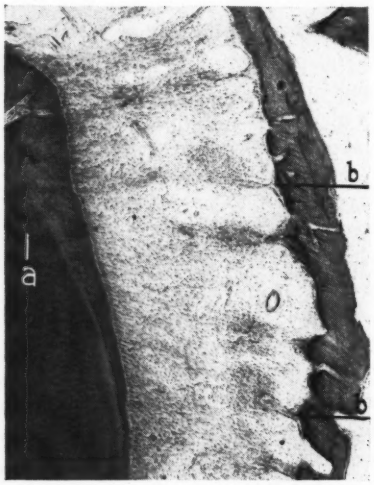
Figure 3—A high magnification of the pressure area is shown. The periodontal membrane is completely necrotic. It is hyalinized and stained homogenously dark. Extreme pressure produces necrosis at the point of application but stimulates osteoclastic activity beyond the periphery of the necrotic area. This explains the presence of the osteoclasts in the bone marrow of this specimen.

Figure 4—Area of tension at the apex. The periodontal membrane is wide, and groups of osteoblasts have started to produce new bone along the lines of tension.

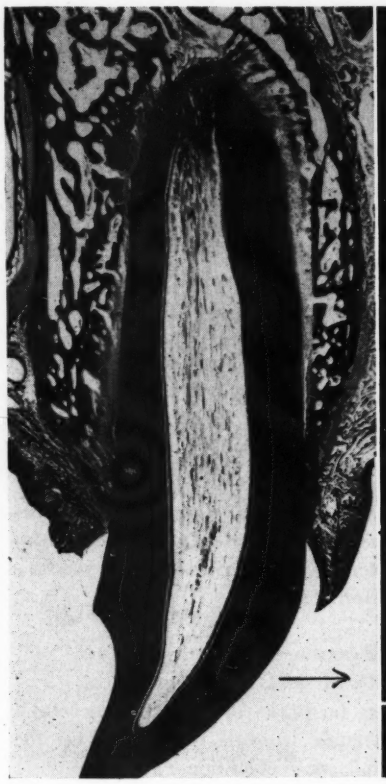
Some men claim that because of tension the fibers of the periodontal membrane become torn, opening the tissues to the invasion of bacteria and thus leading to pocket formation. This process was never observed in experiments and is not substantiated by actual observation.

Figure 5—Osteoclastic activity increases with time and in three weeks almost the entire necrotic area is resorbed and only remnants of necrotic tissue and a cluster of osteoclasts indicate the location of former alveolar bone and periodontal membrane. The extent of bone resorption can only be estimated by the small necrotic area which undoubtedly indicates the original periodontal surface of the alveolar bone.

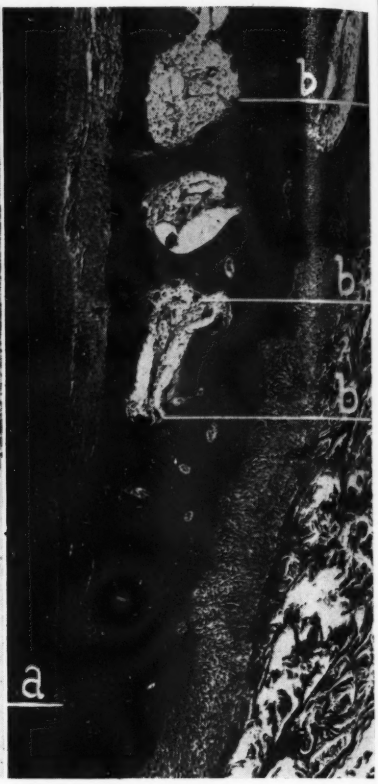
If the extent of traumatized periodontal membrane is greater, the resorption process will be slower. The extent to which the apex has moved can be measured by the presence of a small necrotic area on the pressure side and by the amount of new bone formation on the side of tension. A resting line in the bone indicates the former periodontal surface of the bone.



4. ***Tension area of labial side, apex. (Higher magnification from Figure 2.) Development of new bone along tense periodontal membrane fibers. (a) Apex. (b) New bone spicules.***



2. ***Dog's incisor tipped with its crown to the labial. Periodontal membrane compressed at labial margin, and on lingual at the apex. The lingual side at the margin and the labial at the apex of the periodontal membrane is widened.***



3. ***Higher magnification of labial on pressure side. (a) Necrotic periodontal membrane. (b) Beginning osteoclastic bone resorption.***

Figure 6—The apex of a dog's tooth exposed to trauma for five weeks: (1) As no resorption can take place from the necrotic periodontal membrane, all the bone has to be resorbed by undermining resorption. (2) New bone is produced on the far side of the pressure area. (3) Extensive new bone formation took place on the outer surface of the alveolar bone. (4) The undermining resorption has removed large parts of the old alveolar bone and has proceeded into the newly formed bone. (5) A large part of the necrotic periodontal membrane and old bone, however, are still present and it would undoubtedly have taken another two or three weeks for the periodontal space to be re-established. (6) After the resorption has removed all the bone which lines the necrotic periodontal membrane, the necrotic tissue remnants are also resorbed by macrophages and foreign-body giant cells. A week or two after trauma has been relieved, no signs of the traumatic lesion can be recognized.

Extensive changes can take place in the periodontal membrane and jaw bone, but when trauma has subsided or is eliminated the tissues are rebuilt leaving no sign of former pathologic conditions. Sometimes small resorptions on the root surface and small necrotic tissue remnants indicate previous trauma in a certain area but usually a normal periodontal membrane is rebuilt.

Figure 7—The right and left sides of a young dog's jaws. One tooth (the right) carried a high crown for two months and ten days. The position of the traumatized root within the jaw bone is different. The apex is below the mandibular canal. The apical deformation is the only sign to indicate that a traumatic force was operating at the time this root apex was still in a growing stage. The

5. *Apex of dog's tooth which has been in trauma for three weeks. Only a few clusters of osteoclasts (a) indicate former pressure area. A new periodontal space was created by resorption. A new bone (b) formed on tension side in the amount of movement of the apex.*

6. *Lateral aspect of apex of dog's tooth exposed to trauma for five weeks. Undermining resorption of old alveolar bone still in progress. New bone (b) is formed on the outside of the alveolar bone (a).*

periodontal membrane shows no sign of traumatic changes. The epithelial attachment and gingival sulcus are normal.

Human Tissue Change

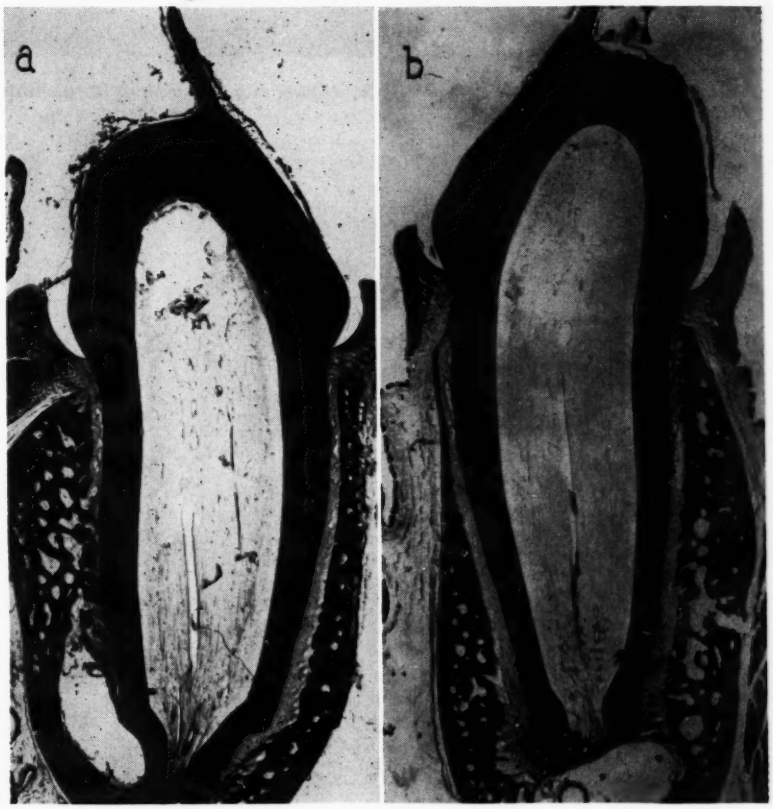
Tissue changes similar to those found in experimental trauma can be found in human autopsy specimens. There is little difference in the pathologic conditions produced by trauma. When a tooth is pressed in a lateral direction, necrosis will occur if the pressure is extensive enough to cause the root surface to come into contact with the alveolar bone. The consequences of this mechanical irritation are the same as those shown occurring in the animal experiments. Upon relief of occlusal trauma, repair will occur in the human being just as it did in the experimental animals.

Primary Occlusal Trauma—Those tissue changes which result from occlusal trauma acting on teeth having a normal periodontal membrane and normal bone are defined as primary occlusal trauma.

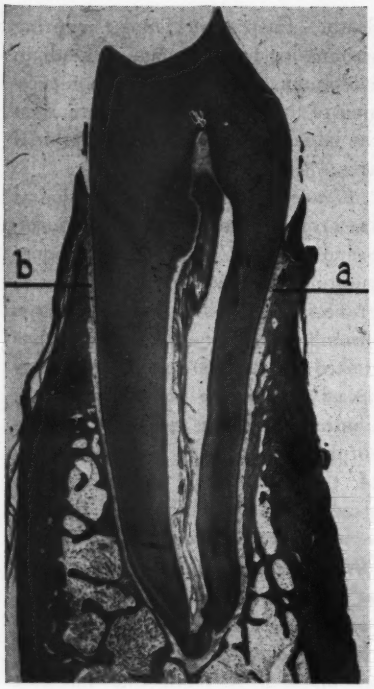
Figure 8—Bicuspid of a human, twenty years of age. The patient died of tuberculous meningitis associated with trismus a few days prior to death. Cusp interference during trismus led to movement of tooth in labiolingual direction and compression of the periodontal membrane on the labial as well as lingual marginal area.

Figure 9—Higher magnification of the compressed periodontal membrane of the labial and lingual marginal areas. Periodontal membrane is necrotic, blood vessels thrombosed. Bone resorption has started on the coronal as well as apical end of the compressed area. Continued trauma and continued resorption would have led to widening of the periodontal space and to loosening of the tooth.

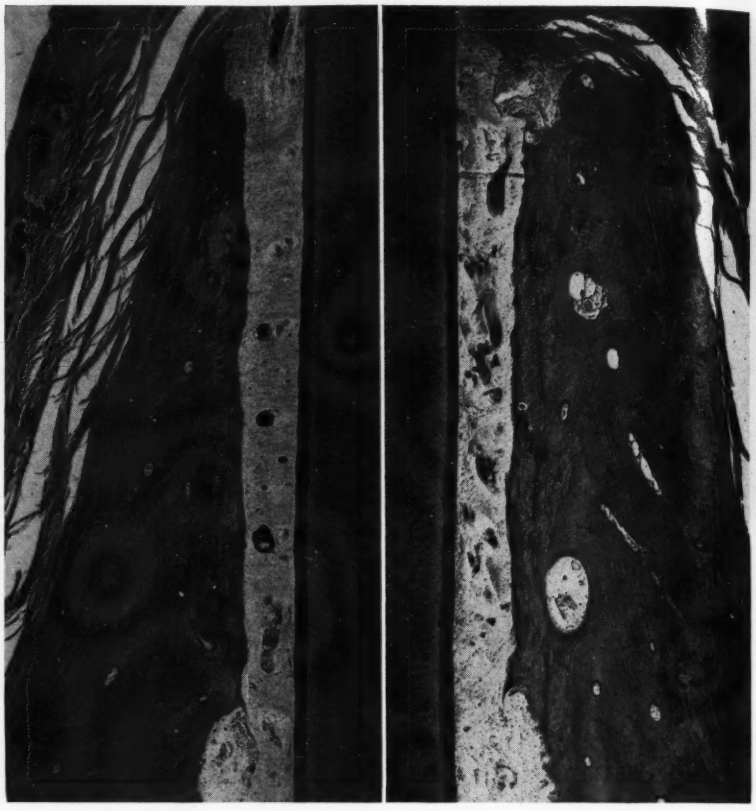
Secondary Trauma—In mouths affected by periodontal diseases, such as gingivitis, periodontitis, periodontosis, or atrophy, teeth exposed even to normal occlusal forces may be traumatized. A tooth that has lost



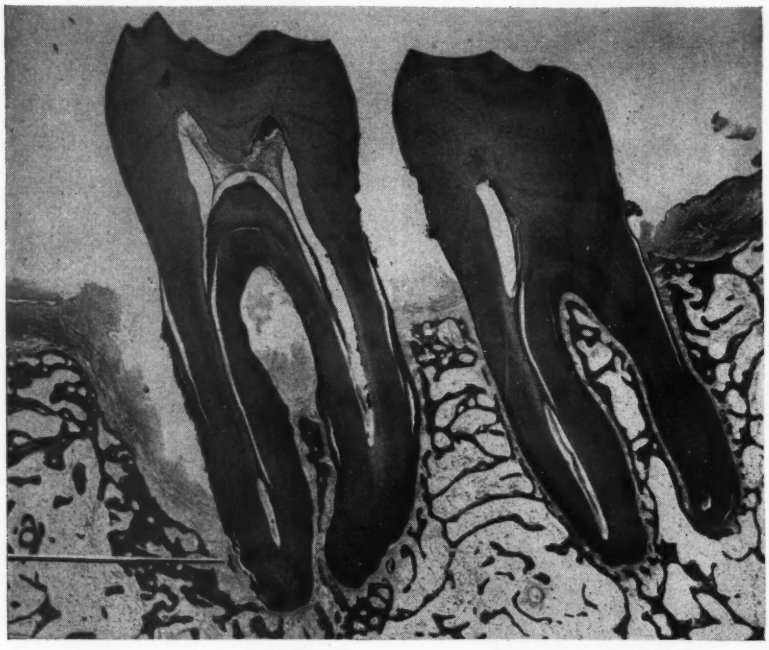
7. *The right (a) and left (b) tooth of a dog. The right tooth (a) carried a high crown for two months and ten days. Note changes in the shape of apex (young dog) and the position of apex to the mandibular canal as compared with the nontraumatized left tooth (b).*



8. ***Bicuspid of twenty-year-old person. Necrotic periodontal membrane due to cusp interference on tooth, the labial (a), and lingual (b) marginal areas. (Primary trauma).***



9. ***Higher magnification of the necrotic periodontal membrane with thrombosed blood vessels and beginning osteoclastic bone resorption at the coronal and apical end of necrotic area.***



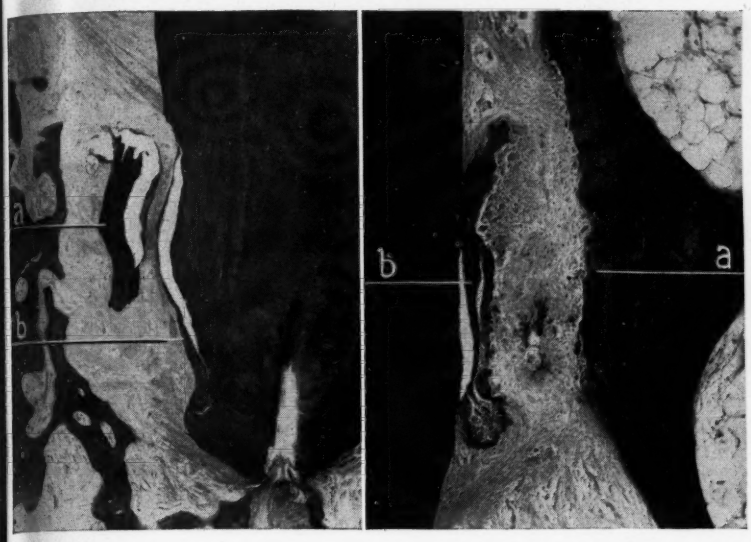
10. ***Second and third lower molars of a middle-aged person. Deep periodontal (intrabony) pocket on second molar. Traumatic cement fracture at apex on mesial side (a). Traumatic pressure necrosis on distal aspect of apex. (Secondary trauma).***

one-third or one-half of the alveolar bone and periodontal membrane cannot function efficiently, even if the occlusion and articulation are normal. Such a condition is termed secondary occlusal trauma. Teeth in this condition (1) may be extremely loose, (2) the periodontal membrane wide, and (3) the alveolar bone rarefied.

Figure 10 — Secondary occlusal trauma is illustrated: (1) more than half of the roots is exposed, (2) deep pockets are present, and (3) the alveolar bone is resorbed, forming a funnel-like crest.

Figure 11—Tear in the cementum close to the apex at the mesial root surface indicates a severe traumatic blow at an earlier time. Tear is partly repaired.

Figure 12—Higher magnification of the apical membrane at the distal side shows osteoclastic resorption taking place on the periodontal surface of the alveolus and some necrotic



11. ***Traumatic tear in cementum (a), repaired by new cementum (b).***
12. ***Distal periodontal membrane of apex of molar in Figure 10. Osteoclastic bone resorption (a) due to pressure. Necrotic tissue remnant (b) from previous traumatic pressure, with osteoclasts resorbing necrotic material.***

tissue remnants are present close to the root surface. This necrotic tissue also undergoes osteoclastic resorption.

A tooth having lost some of its alveolar bone and periodontal membrane can be affected much more by occlusal trauma than would be the case if the periodontal tissues were normal.

Importance of Occlusal Balance

Histopathologic investigations definitely show that occlusal balance is a highly important factor in the maintenance of periodontal health:

1. Occlusal trauma will produce traumatism, a morbid condition characterized by pressure necrosis, hyalinization of tissue, thrombosis, hemorrhage, bone and cementum resorption.

2. It will not lead to tissue degeneration characteristic of periodontosis.

3. It will not produce simultaneous atrophy of alveolar bone and gingiva, known as recession, and it will not produce hyperplasia.

4. It will not produce clefts, festoons, or nodules.

5. A harmonious occlusal relation between the lower and upper arches is a prerequisite to periodontal health. The supporting tissues of the teeth are functionally built and react to functional changes. It is obvious that a disharmony in functional relation will not be desirable and it must constantly be bept in mind that the better the functional relation, the better the chances for periodonal health. Fortunately, tissue adaptation to changes in functional relation is great and functional disharmonies, therefore, do not always lead to traumatism.

Conclusion

The results of histopathologic study make it evident that occlusal trauma, primary as well as secondary, produces a severe destruction of the periodontal membrane and alveolar bone. It is therefore the duty of every dentist, and especially of every periodontist, to prevent and correct occlusal trauma.

It is also the dentist's duty to establish the best possible functional relation between the upper and lower teeth. The better this relation, the better the chances for continued periodontal health.

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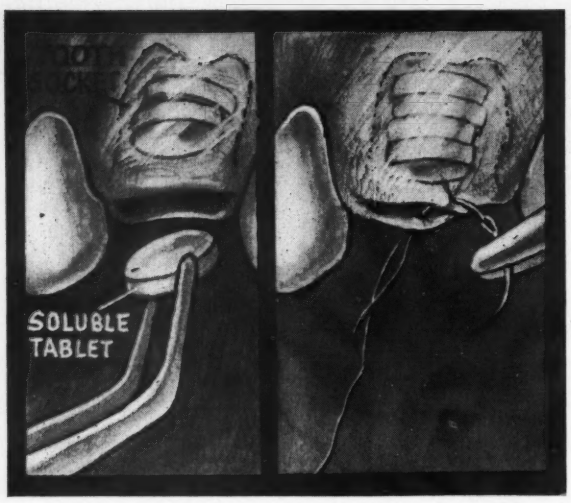

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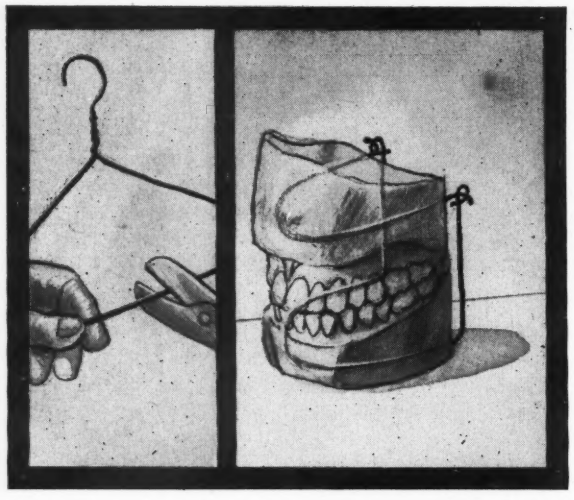
Clinical and Laborato

Postoperative Care of Extraction Wounds

Harold F. Kedian, D.M.D., Watertown, Mass.

1. After an extraction place one to four 50,000-unit pure crystalline penicillin G tablets in the socket and retain with a suture if necessary.

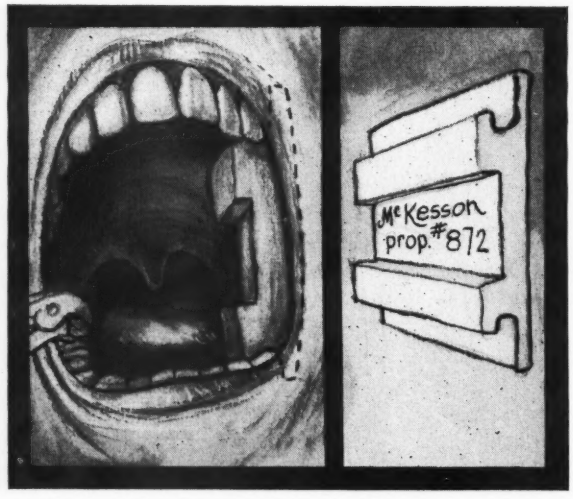


2

Mounting Study Models

J. Silverman, D.M.D., Dorchester, Mass.

2. Cut a 14-inch and an 8-inch section from a wire clothes hanger. The longer section is used for the mandibular part of the articulator and the shorter for the maxillary. Bend the wires and connect the two parts as shown in the illustration.



3

Support of the Temporomandibular Joint During Extraction of Lower Teeth

Robert A. Atterbury, D.D.S., Oak Park, Ill.

3. The use of a rubber prop during removal of lower teeth will support the temporomandibular joint and the mandible and reduce the number of postextraction subluxations. The rubber flange is inserted between the cheek and the teeth, thus keeping the prop from being dislodged lingually. The muscles of the cheek prevent the prop from being displaced buccally.

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SUGGESTIONS . . .

Protection of the Dentist's Fingernails

W. C. Norcross, D.D.S., East Walpole, Mass.

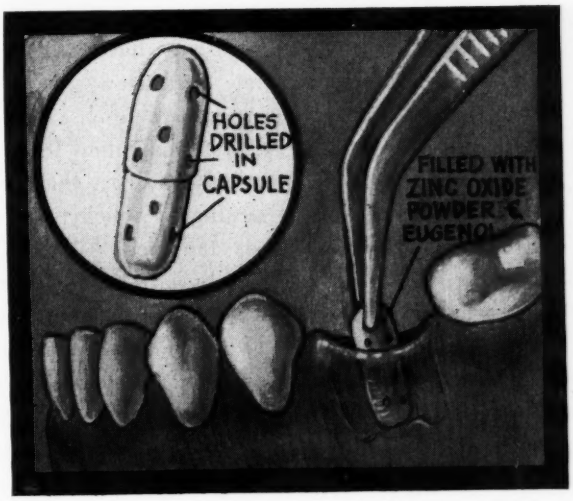
4. Before doing any kind of "dirty work"—gardening, painting, working on an automobile—work a thick lather of soap into the hands and under the nails and let dry.

4

Treatment of a Dry Socket

S. M. Dooreck, D.D.S., Brooklyn, N. Y.

5. Drill holes in a gelatin capsule. Fill the capsule with a zinc oxide-eugenol paste or any other kind of postoperative paste medication. Insert the capsule into the socket. The gelatin capsule will dissolve and the sedative will be deposited in the proper place.

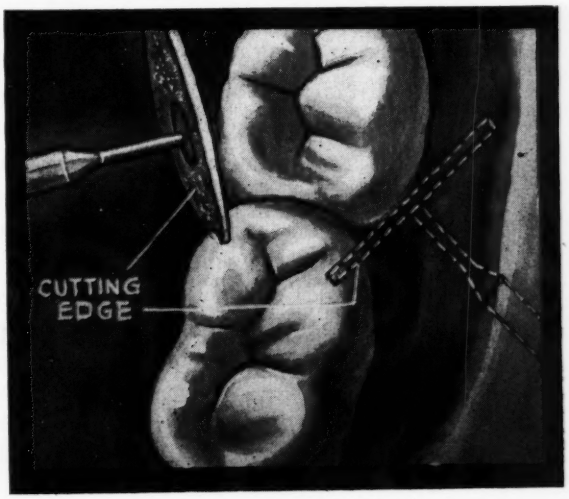


5

A Slice Technique in Operative Dentistry

Robert I. Schattner, D.D.S., Flushing, N. Y.

6. Use a safe-side diamond disc to prepare the buccal and lingual slices. Hold the *safe side* of the diamond disc as close as possible to the proximating tooth and at the proper angle to create the desired outline form and extension for prevention.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 378 for a convenient form to use.

Send your ideas to: Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

The EDITOR'S *Page*

THE ADAPTATION of tungsten carbide to dental burs has been a metallurgic and engineering achievement of importance. Although tungsten carbide drilling points have been used in industry for more than twenty years the adaptation of this alloy to dentistry is a relatively recent development. There is still much to be learned about bur design and metallurgic formulae. Some tungsten carbide burs are superior to others in design, cutting ability, and longevity.

An informative article in the *British Dental Journal*[1] gives these facts:

"As tungsten carbide has now been in wide use throughout the engineering and mining industries for the past twenty years, formulae for grades suitable for the drilling or fabricating of most materials related to these industries have now been standardized for some time past. However, when the first serious attempts were made to cut enamel with tungsten carbide burs it was found to have entirely dissimilar characteristics from the more usual substances in the cutting of which tungsten carbide had normally been employed. Although it appeared to be only relatively hard it was found to be extremely tough and had abrasive qualities considerably in excess of other and apparently harder substances. Therefore, it became necessary to employ practically the hardest grade of tungsten carbide made to give the bur a life commensurate with the average tungsten carbide cutting tool.

"It will be appreciated that tungsten carbide is no exception to the normal relation between hardness and tensile strength and thus, although it might have proved practicable to have followed the normal steel bur design when using the softer grades of tungsten carbide, this was far from the case when it was found necessary to use the very hardest grades of the metal. This is understandable when it is realized that to provide adequate cutting clearances, the angle formed by the two surfaces of each blade of a steel bur must be approximately 40 degrees. If a tungsten carbide bur of the required hardness to cut enamel were reproduced to this pattern the blades would be liable to chip as soon as they were brought into contact with the enamel surface under any degree of pressure, and little would be gained by the mere thickening of the blades as this would form incorrect cutting angles and reduce the groove clearance.

"This chipping of the blades of tungsten carbide burs has been one of the chief factors that has limited the widespread usage of the early types. Once the blade has chipped then all other advantages that it may possess are immediately lost.

"The main problem of tungsten carbide bur design is, then, to strengthen the blades beyond the point when chipping will occur and at the same time to maintain adequate clearances. In a larger tool than a dental bur this could be accomplished fairly easily by first roughly cutting the grooves, and then grinding a land on the blades to form the correct cutting clearance angle at a subsequent machining operation. However, owing to the small diameters involved, this method is difficult to apply commercially.

"It has been found possible, however, to grind the blades to the profile shape. This design has the advantage of thickening up the individual blade so that it is strong enough to resist chipping and at the same time to provide the necessary cutting and clearance angles. This shape of blade edge also resists abrasive wear and consequently ensures a much longer efficient cutting life for the bur.

"A second deviation from normal steel bur design is also necessary if the maximum effectiveness of tungsten carbide is to be utilized. Steel burs sized numbers 3, 4, and 5 are formed with eight blades. Owing to the angle of the blades this allows adequate cutting (of dentine) without clogging. When the blades of tungsten carbide burs are formed to the required shape described previously it is not practicable to have more than six such blades to the diameter of 3, 4, and 5 size burs.

"It has been found by repeated trial and experiment that six blades yield the best results and permit of smooth cutting. At one time it was feared that a reduction in the number of blades might have the effect of producing increased vibration. If the blades could not be relied upon to maintain their edges for a long period, this would certainly be the result."

[1]Osborne, J.; Anderson, J. N.; and Lammie, G. A.: Tungsten Carbide and Its Application to the Dental Bur, Brit. Dent. J. **90**:232-234 (May 1) 1951.

MEDICINE and the Biologic Sciences

Weight Loss in Obesity

Weight loss is a problem of importance, and even of necessity in many instances, to many obese individuals. These persons usually eat too much so that their problem is one of restriction of the caloric content of the diet.

It is common to administer thyroid or dextroamphetamine sulfate in conjunction with diets of around 1,000 calories. An interesting series of studies was conducted on the relative merits of thyroid as compared with dextroamphetamine sulfate.

The administration of dextroamphetamine sulfate (5 milligrams three times a day) has a highly significant effect in increasing weight loss when used in conjunction with a 1,000 calorie diet. Thyroid (30 milligrams three times a day) has no significant effect in similar circumstances.

Thyroid and dextroamphetamine sulfate apparently have no effect on each other. The effect of the dextroamphetamine persists undiminished over months of treatment. There is no significant difference in its effect in different months. The mean weight loss per month without dextroamphetamine sulfate treatment was 5.77 pounds. This weight loss was increased by 2.4 pounds by the administration of dextroamphetamine sulfate.

The drug should be administered only under careful supervision. Frequent examination is essential in order to prevent any deleterious reactions.

Edwards, D. A. W., and Swyer, G. I. M.: Comparative Values of Dextroamphetamine Sulfate, Dried Thyroid Gland and Placebo in Treatment of Obesity, Clinical Science 9:115-127 (*May* 30) 1950.

Healing of Fractures

A fracture is classically defined as a traumatic dissolution of continuity of bone. The impulse to heal is inevitable at the start. It is inexorable in its completion unless local causes, pathologic or mechanical, intervene.

The actual incident of trauma is in itself the effective stimulus to a chain of physiologic and histologic reactions. These in predictable sequence constitute the process of reparative osteogenesis. The healing process is entirely a local reaction confined to the vicinity of the fracture.

When a bone is broken, a number of tissue reactions occur simultaneously in the vicinity of the fracture. There is a variable amount of tissue destruction along the fracture surfaces and neighboring soft tissues. Such tissue destruction leaves areas of necrosis which must be removed by the blood stream or by cellular scavengers. At the same time local hemorrhages take place, with extravasation of fluid into the adjoining tissue spaces, and dilatation of the surrounding blood vessels producing active local hyperemia. This is the reaction of inflammation, the purpose of which is the cleansing and healing of a wound.

Hemorrhage soon stops unless vessels of the largest caliber are injured. Granulation tissue is found as early as twenty-four hours after the injury. Manipulation of the fracture during this period does not necessarily interfere with or retard healing because such simple granulations are rapidly reformed. In due course, the granulations are converted into fibrous tissue, the soft callus of the older writers.

Fibrous tissue begins to form between the fifth and eighth days in the fracture space. Between the tenth and twentieth days isolated islands or threads of cartilage may appear in scattered areas of the callus.

During this period and evidently unrelated to the soft callus of the fracture space, a primary callus of immature bone develops directly from the periosteum above and below the traumatized area. The distance which it extends is conditioned solely by the demands of the position of the fragments. Its structural pattern is designed to form most economically a partially circumferential strut which crosses the fracture space. The strut holds the fragments fixed in their established position while the definitive callus is consolidating.

This primary or external callus is for the most part a temporary structure. That portion of it which will ultimately come within the structure of the definitive callus will be replaced by mature bone. The rest of it will be resorbed as its structural usefulness passes during the remodeling phase of healing.

A rather firm fibro-fibrocartilaginous conglomerate forms from the fifteenth to thirtieth days. The conglomerate is ordinarily hard enough to prevent movement of the fragments except by additional external force.

The healing point of a fracture can be defined as "that point or moment during the process of reparative osteogenesis at which callus has been formed in sufficient strength to enable the bone to withstand the stresses and strains to which it is normally accustomed in its sound state." This point is subject to many variables. Functional healing occurs long before normal architecture is restored.

It is recognized that with internal fixation of fractures the determination of the healing point is more difficult. Even the x-ray appearances are so altered as to be misleading. Judgment is still the best method of determining the healing point in most instances. Also it must be remembered that it is the nature of bony fractures to heal themselves.

Editorial: Healing of Fractures, Am. J. Surg. **80**:843-845 (*December*) 1950.

Rejuvenation in Geriatrics

The geriatric treatment of old men and women with substances possessing anti-aging (or so-called rejuvenating) properties appears to be dangerous. In some cases the treatment may be extremely dangerous.

The morphology, physiology, and biochemistry of the young growing organism are substantially different from those of the adult. These processes in the old adult are quite different. The cessation of growth processes is mainly responsible for this difference in the adult. And in the old the weakening changes of all organs and functions are added.

If complete rejuvenation treatment could be instituted, those stimulating factors which promote growth of the whole organism or of certain organs and tissues would be especially dangerous. Interference with the natural brake mechanisms which control the processes of growth at the time of life when the brake mechanisms are in full operation might result in gigantism of the whole organism or of some organs or tissues. Disorganized growth as tumors and monstrosities along with degenerative and aseptic inflammatory changes produced by intoxication with overstimulating factors might be produced.

The causes of aging are numerous. Therefore, the anti-aging factors must also be numerous. No single factor or single group of factors, such as the hormones, can be expected to reverse all processes of senescence.

There are numerous diseases which complicate present day pathologic aging. These diseases are responsible for many features of premature and abnormal senility and premature death. Prevention and elimination of these diseases will go far in adding years to the life span. Removal of metabolic waste products which accumulate in and intoxicate old organisms is of the greatest importance for preserving youth and preventing senility. In future geriatric treatment not only all major causes of aging must be eliminated but minor ones as well.

Korenchevsky, V.: Rejuvenative, or Preventive and Eliminative Treatment of Senility, Geriatrics **5**:297-302 (*November-December*) 1950.

Hemophilia—General Considerations

Hemophilia is not an uncommon disease. Its importance has not been sufficiently stressed. As a result, many cases of hemophilia remain undiagnosed. These patients often receive inadequate care and become crippled as the result of hemorrhages which might be prevented or controlled.

The diagnosis is made on the correlation of (1) clinical history, (2) physical findings, (3) family history, and (4) results of laboratory studies. The diagnosis is not difficult unless the condition is severe. However, difficulty is encountered when the bleeding tendency is not pronounced and the family history is negative for hemophilia.

As the disease is congenital the bleeding tendency is present at birth, even though it may be latent. Many of the patients have their first excessive bleeding after circumcision. Easy bruising after minor blows and bumps is a common observation in the disease. The discoloration of the skin often appears only after several days following the blow. (In true purpura the formation of ecchymosis is prompt.) It is not uncommon for hemophiliac boys to have numerous black and blue spots.

Epistaxis, contrary to the generally accepted belief, is not frequent. Abnormal bleeding after a tooth extraction or a minor operation is the first manifestation and, in some cases, the only sign of a bleeding tendency. Bleeding into joints usually occurs after the boy begins walking and engaging in relatively strenuous games. Hemarthrosis generally denotes moderately severe hemophilia.

In a large number of hemophiliacs no positive family history is obtainable. The defect can pass silently through several generations of women.

The laboratory offers valuable aid in the diagnosis. The coagulation time is usually prolonged, provided the test is done on venous blood carefully collected to avoid contamination with tissue juices. The clotting time method based on capillary blood is worthless and misleading. The prothrombin consumption test is far more specific than the coagulation time for hemophilia and, furthermore, is quantitative.

Nearly all bleeding hemophilia comes from arterial vessels. Small cuts that involve only capillaries rarely bleed abnormally. Capillaries when injured are closed by a primary contracting force and by the natural adhesive properties of injured endothelium, which is not impaired by the disease.

Following an injury, the three cardinal phases of treatment are (1) cold, (2) pressure, and (3) rest. The application of an ice bag often accomplishes singly as much as or more than a combination of other therapeutic measures. Pressure is valuable if the site of injury permits its application.

When local means fail, a transfusion of lyophilized or fresh plasma or whole blood should be given to raise the thromboplastinogen level sufficiently to provide the hemophiliac with some hemostatic efficiency. The prevention of contractures and crippling ankylosis of joints constitutes

one of the most important problems of the disease.

Quick, Armand J.: Management of Hemophilia in General Practice, J.A.M.A. **145**:4-8 (*January* 6) 1951.

Television vs. Eye Strain

The popularity of television has introduced some new medical problems. One of the most important of these is the question of eye strain from watching television.

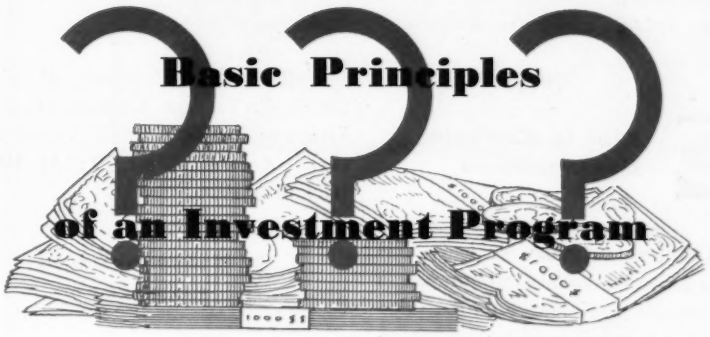
The concensus at the present time is that for small or moderate size screens, a distance of roughly ten times the diameter of the screen is found most comfortable for clear viewing and avoidance of eye fatigue. If eye fatigue occurs at about this distance in a person with no visual abnormalities, the distance may be changed.

The optimal distance from which one should watch television varies from one person to another, depending at least partly on his state of refraction and on the size of the screen. Placement of furniture and room size also influence one's preference. In general, a distance of ten feet or more would be preferable, since then there is necessary only a moderate amount of convergence and accommodation.

Changing occasionally from one chair to another should help in avoidance of fatigue not only of the sense of vision but also of the neck muscles. Regardless of the distance of viewing, there seems to be no evidence that the fatigue in the normal eye will cause pathologic changes. The chief problem is that of comfort.

At a distance less than ten times the diameter of the television tube the picture loses in quality, as the scanning lines then become visible. The more defects in the picture, the greater is the tendency for visual fatigue. This includes such defects as the following: (1) out-of-focus pictures, (2) those that are too dim, (3) too flat, (4) too much contrast, and (5) those that weave and jump.

In your ORAL HYGIENE this month



You're the president; you're the treasurer; you're the whole board of directors. You are really doing the work of every officer of a large company when you manage your practice efficiently—for your practice is, in effect, a "one-man business," differing from larger businesses *in scale only*. That's why you'll welcome the new series of articles beginning in this issue of Oral Hygiene. They're written by John Y. Beaty, Editor of "Investor's Future" and former Editor of "Bankers Monthly." The first is titled, "Basic Principles of an Investment Program."

★ ★ ★

"The Dental Office That Travels Thousands of Miles" is manned by an Australian dentist who maintains an adventurous itinerant practice in the Mexican state of Baja California. His many miles over unmapped roads have brought him excitement—and an enviable knowledge of the people, the customs, and the geography of this interesting section of the world.

★ ★ ★

"Damn the Statistics!" says Doctor Philip Parker in his article, "There Is NO Shortage of Dentists," and explains:

"In the first place, there is plenty of shopping going on which would indicate that in dentistry we are in a buyer's market. Of late there has been a return to the old oriental-bazaar haggling over 'price'—with no holds barred . . . If you are one of the many dentists who have plenty of free chair time, then ten angels swearing that there *is* a shortage of dentists will make no difference."

"What Does Your Office Sound Like?" asks Doctor Maurice J. Teitelbaum. Most dentists don't know. They have become accustomed to—and actually *do not hear*—many of the noises that may be irritating to the patient in the chair. He suggests ways to eliminate or minimize many of these distressing sounds.

★ ★ ★

"Being a dentist does not make you a deity," is one of the pithy comments with which Doctor Estelle M. Natelson drives home her points in the article, "Human Relations in Dentistry." She explains her tested formula for establishing happy dentist-patient relationships.

★ ★ ★

Here's a dentist who turned an invention into $415,000! His story should encourage every dentist with a creative flair to keep on "playing around with ideas." Though Doctor Elmer G. Kesling's spectacular success received much publicity in newspapers and magazines, it has made little difference in his life—he's busy on another invention!

★ ★ ★

How do you compare with "Doctor Three-Dollar"? In setting your fees, do you figure your fixed expenses and determine your cost of operation per hour? Doctor John H. Mosteller claims that many dentists who do not use this businesslike method of establishing hour-costs, charge too little for such items as amalgam restorations. Since these are the bread-and-butter items in most dental offices, their pricing can mean the difference between a satisfactory and an unsatisfactory income.

Television should be observed in a lighted room so that there is not too great a contrast between the screen and the background.

Television: Queries and Minor Notes, J.A.M.A. **145**:361 (*February*) 1951.

Diet in Essential Hypertension

Additional clinical evidence has been recorded corroborating much in the reports by Kempner on the value of the rice diet in hypertension. Beneficial effects are noted with respect to (1) symptomatology, (2) hypertension, (3) retinopathy, (4) electrocardiographic changes, (5) cardiac enlargement, (6) electrolyte and nitrogen metabolism, and (7) total serum cholesterol. Unfavorable but reversible effects on discrete renal and hepatic function are sometimes noted.

The effects of systematic addition of sodium chloride to the rice diet, without the patient's knowledge, corroborates the view that the extremely low sodium content of the rice diet is the most significant factor in reduction of the blood pressure. Addition of salt-poor protein and of fat suggests that the rice diet may be unneccessarily restrictive with respect to protein and perhaps other substances.

Rigid restriction of sodium seems to be an important principle in the diet of at least those subjects with essential hypertension who require more than reassurance, weight reduction, or mild sedation.

Effective application of the diet for sustained treatment is exceedingly difficult because the critical tolerance level of sodium intake with respect to hypertension appears to be extremely low in many patients with progressive hypertension and in those with advanced stages of essential hypertension. Sodium intake above the critical level causes prompt return of hypertensive manifestations.

Prolongation of the Kempner regimen in its present form imposes such hardship on the patient and so much difficulty in control as to make it impractical for general use. However, the results of sodium restriction in essential hypertension seem to be promising enough to justify further exploration.

Watkin, D. M.; Froeb, H. F.; Hatch, F. T.; and Gutman, A. B.: Effects of Diet in Essential Hypertension, Am. J. Med. **9**:441-494 (*October*) 1950.

Hormones and Cancer

The behavior of some cancers of the breast and prostate gland may be altered either by the administration or deprivation of the sex hormones. The responses of the apparently susceptible carcinomas are variable and appear to be partly dependent upon other factors not necessarily related to the primary disease.

Before instituting hormone treatment of cancer two cardinal principles must be considered: (1) Knowledge of the natural behaviors of neoplasms essential for an understanding of the rationale of any method of therapy. (2) Recognition that no cancer initially deemed curable by established procedures should be considered for trial with experimental techniques.

With these principles in mind the indications for endocrine therapy in neoplastic disease are: (1) utilization as the primary treatment when the disease has advanced locally or distantly beyond the probability of effective control by surgery or radiation, and (2) utilization as an adjunct to orthodox methods, especially when the disease becomes widely disseminated.

Castration is usually of benefit only in premenopausal patients with advanced breast cancer. It is of particular value for osseous or pulmonary involvement. Systemic changes, consisting of improvement of physical status, relief of pain, renewed appetite and weight gain, are noted.

Favorable effects of castration at best do not last for more than a few years. Thus, it would appear reasonable to withhold the procedure until such a time when the disease might recur and be boyond the control of surgery or radiation.

Cancer of the male breast is rare. However, the disease is usually advanced when the patient is first seen. The effect of castration on advanced cancer of the male breast is usually more striking and frequent than that seen in the female. And too, the longevity of palliation is usually greater.

Androgens may be used as palliative agents for advanced breast cancer in women at any stage of life. Subjective improvement occurs in a higher percentage of individuals and considerably outweighs objective beneficial effects in detectable lesions. Androgens are of most value for the relief of dissabling symptoms and pain secondary to osseous metastasis.

Estrogens are of the greatest value in the palliative treatment of advanced manifestations of breast cancer in older women. This therapy should be reserved for patients in the postmenopausal group, preferably five years or more after the last menses. The use of estrogens in premenopausal women and during the menopausal period appears to have accelerated the disease in a number of instances.

Orchiectomy and estrogen therapy are of considerable value in advanced prostatic cancer particularly in the presence of widespread and distant metastasis. Orchiectomy is the preferred technique if the patient is unreliable or cannot tolerate estrogens. It is also the procedure of choice where immediate relief of symptoms is desirable, since estrogens may require several weeks to produce the same effect. In all other situations estrogens may be used to advantage.

The more serious complications of hormonal therapy are: (1) congestive heart failure, particularly in older individuals occurring as a result of edema due to salt retention; (2) hypercalcemia occurring only in patients with osseous metastasis but particularly those who are confined to bed; and (3) intractable nausea

and vomiting. Therefore, it is evident that extreme caution must be exercised during the entire period of hormonal therapy.

Nathanson, Ira T.: Hormonal Treatment of Cancer, M. Clin. North America **34**:1409-1417 (*September*) 1950.

Contra-Angles

Krebiozen

The scientific world was stunned last spring by an unorthodox form of announcement from Chicago that a new cancer cure had been discovered. The drug is called krebiozen. The announcement was made to a heterogeneous group by one of the most highly regarded physiologists in the world. All other identifications with the scientific method were lacking.

An editorial in the *Proceedings of the Institute of Medicine of Chicago* describes the attitude of most conservative investigators to the method of announcing krebiozen:

"Medical science has established procedures and standards of reporting progress of experimental and clinical results. The announcement in Chicago, March 26, 1951, of krebiozen, described as 'an important step' toward a final goal of chemotherapy of cancer, ignored these procedures and standards. There was no publication in a medical or scientific journal; there was no presentation made before a learned society. Instead, krebiozen was announced to a mixed group of physicians, medical educators, public officials, and representatives of the press.

"The information provided on this unusual occasion met few of the accepted criteria of medical reporting. One of the essentials when a new biological agent is presented is a clear account of the technic of its preparation or isolation and, when possible, an exact and complete description of its composition. No such information was provided as to krebiozen, except that it was separated from the serum of a horse after 'stimulation' of its reticuloendothelial cells. Its method of preparation and its composition are expressly stated to be secret. The booklet distributed at this meeting, which purported to give clinical details on 22 cases, was gravely deficient for the purposes of evaluation.

"Accepted requirements for medical reporting have developed because of the importance of protecting the profession and the public from false or misleading claims. Violation of these requirements, as the krebiozen incident demonstrates, has unfortunate consequences in arousing false hopes which tend to discredit the medical profession. Such a regrettable disregard for the established practice cannot be condoned. The conventions of reporting exist as safeguards against the well-intentioned motive as well as against that which is dishonest. The collective interests of medical practitioners and investi-

for use at the chair . . .

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gators of Chicago demand rigorous adherence to these conventions."

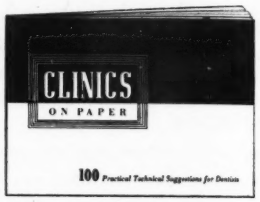
The announcement of krebiozen dramatizes the whole subject of method in scientific reporting. Secret preparations and drugs of unknown composition have little place in the armamentarium of present-day dentists and physicians. We want to *know* what we are using. Clinicians are not expected to be biochemists and the fine points of micro and biochemistry escape most of us. To the average clinician a structural formula and a chemical name of many letters are void in meaning. We do, however, expect to be told the scientific rationale of the drug and be informed of the principles of its action.

Whenever the name of a drug is submerged in secrecy we have cause to believe that it may be a nostrum, a "patent medicine," a money-maker. Clinicians have no objections, nor has the public, to have a discoverer and a manufacturer of a drug of merit make a reasonable profit from his efforts. Whoever creates a therapeutic product of any form—a drug, an instrument, a procedure—is entitled to a generous reward. If the cure for cancer is discovered, or for any other disease, for that matter, the discoverer should receive fame a thousand-fold and all the money he may need in his lifetime. The therapeutic tool, whatever it may be, must be available for general use and at a price that everyone can afford. The profiteer has no place in this field.

Often we encounter dentists who have created an instrument, a technique, or a method of treatment that they believe will revolutionize dental practice and bring riches to them. Most of these hopeful ones will be disappointed. A good many of them will spend so much time on their "discovery" that they will neglect their practice while dreaming of rewards. If they, by an outside chance, make a profit the tax collector will be there with his extended hand for a large part of it. We would exhort the dental researcher or inventor to consider his anticipated gains, not in big money, but in the sense of personal satisfaction and approval from his colleagues. We would also exhort him to make the presentation of his discovery within the framework of accepted scientific reporting by publication in a professional journal or presentation before a professional group. Neither the spectacular nor the secretive methods of announcement will win confidence among his colleagues. We have no patience with the flamboyant or the mysterious. The clinician expects to *know* what he is using.

How's Business?

Dentists, like other producers, are asking this question among them-



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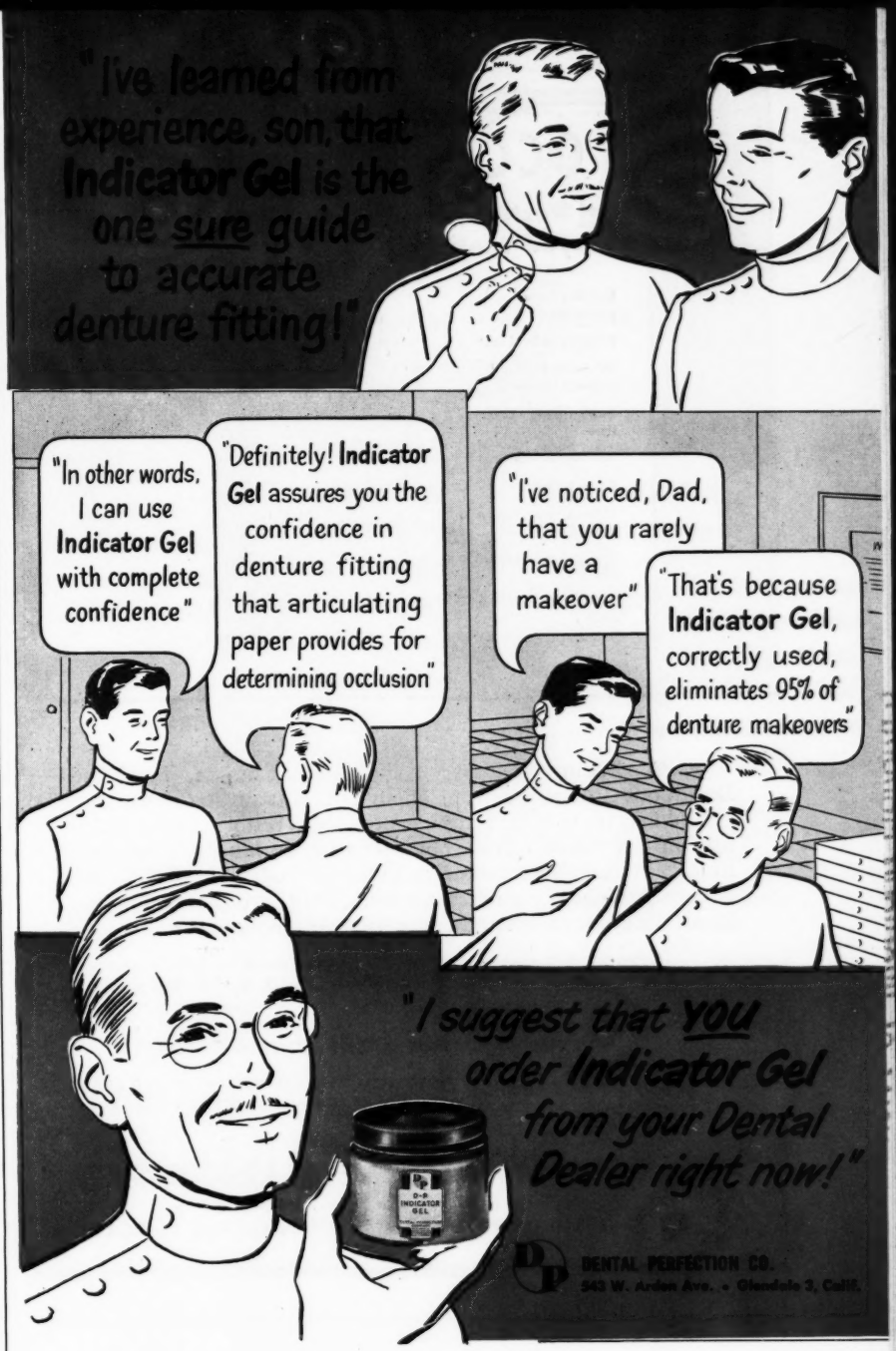
selves. The answer is uniformly guarded and restrained. Dentists are noting a buyer resistance to prosthetic restorations and are meeting more people who are concerned with price for even the smaller services. Many practices are noticing a mounting column of accounts receivable. Although these trends are present in most dental practices, many dentists are not aware of them because they seldom take time to examine their books and records. They know, themselves, that they are busy but they notice that they do not have as much cash available as they had two or three years ago. They blame high prices and high taxes but fail to know that their records may show another truth: a decline in gross business.

Dentists, like other people, often overextend themselves and buy at unfavorable times. They obligate themselves for new homes at inflated prices, buy four-thousand-dollar automobiles where ones half that costly would do as well; take trips to Europe and to swanky places while a vacation at a less expensive place might actually give them more pleasure and relaxation.

Many consumers, the people required to live on fixed incomes, are being driven from the dental market. After they pay excessive prices for food, clothing, and shelter, and make their high tax payments they have little left for dental care except of an emergency nature. Go over your records and see how many people in the fixed-income categories haven't been in to see you recently! Among the people who do come to you observe the rising note of economic doubt and pessimism. Look in automobile showrooms and in warehouses and observe the "hard" goods that are not moving out into the buyers' hands. And if the buying of TV sets and automobiles has slowed down we may be sure that dental buying will be choked off.

When signs of economic distress are raised the smart operator is the one in a cash position who can buy at *his* terms. Over the past ten years the seller has been the one calling the tune. Let's not be too surprised to see the buyer one day again coming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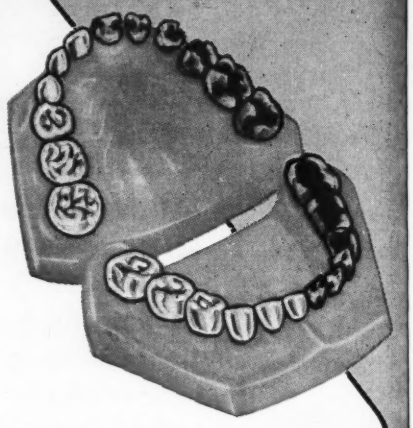

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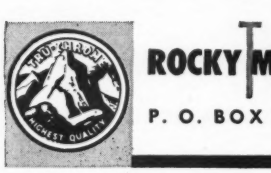

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into his own. And the buyer with the green goods in his hand is the one that always has the attention of the one who sells in a distressed market.

The dentist who buys nothing at inflated prices that he doesn't urgently need and keeps his cash position strong will be picking up bargains when the less foresighted must begin to sell under pressures.

People are becoming perturbed over a system that seems to be able to operate only in a war scare or war economy. Even people who are receiving high wages for their services and high prices for their products are uneasy because they know that when *they buy* things and services they, too, must pay high prices. As the spiral of inflation whirls higher thousands of consumers are thrown from the market. That means that the aggregate buying power of the population is reduced and the market shrinks. Price and credit controls will not save us for long—they are antidotes that do not correct the underlying disease.

So long as we pay high taxes to run the affairs of the entire world as we are now doing there can be no hope of relief. To pay the global taxes the worker will demand more for his hire, the farmer more for his produce, the landowner and the landlord more for his property. Almost everybody will handle more money but will actually have less purchasing power. Some people on fixed incomes will have little or no purchasing power at all. Distress and unrest will fall upon the land and we will be headed for the events that were predicted by Lord Thomas Macauley almost a hundred years ago. On May 23, 1857, Macauley wrote to H. S. Randall:

"I seriously apprehend that you will, in some such season of adversity as I have described, do things which will prevent prosperity from returning; that you will act like people who should in a year of scarcity devour all the seed-corn, and thus make the next year not of scarcity, but of absolute famine. There will be, I fear, spoliation. The spoliation will increase the distress. The distress will

produce fresh spoliation. There is nothing to stop you. Your Constitution is all sail and no anchor. As I said before, when a society has entered on this downward progress either civilization or liberty must perish. Either some Caesar or Napoleon will seize the reins of government with a strong hand, or your republic will be as fearfully plundered and laid waste by barbarians in the twentieth century as the Roman Empire was in the fifth; with this difference, that the Huns and Vandals who ravaged the Roman Empire came from without, and that your Huns and Vandals will have been engendered within your own country by your own institutions."

Our despoilers, our ravagers, that have been engendered by our own institutions, are people in and out of government who have somewhere along the way lost the tune of the American song and are now carrying a strangely alien note.—E. J. R.

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Tumors of the Head and Neck

(*Continued from page* 358)

squamous cell elements. These tumors usually metastasize; however, a pure basal cell carcinoma does not.

Origin: 1. One theory is that they originate from the basal layer of epidermis. 2. Another theory is that they originate from hair follicles.

It would seem most likely that they develop from epithelium which is capable of forming hair follicles since they can frequently be traced to the basal layer of the epidermis. They are not seen on skin where hair follicles are not found; namely, the palms of the hands, the soles of the feet, and the surfaces of mucous membrane.

It has been suggested that the squamous-like elements in certain basal cell carcinoma are attempts at the formation of hair matrixes.

Diagnosis: The diagnosis of carcinoma of the skin can be made clinically in about 80 to 90 per cent of the cases. However, a biopsy should always be performed to confirm the diagnosis histologically. The biopsy specimen should be taken from the clean edge of the lesion. It should be deep and should also include a portion of the adjacent normal skin.

Treatment: Carcinomas of the skin are theoretically curable by a variety of therapeutic means, such as escharotics, cryotherapy, electrocoagulation, cautery excisions, scalpel excisions, curietherapy, and roentgen therapy. It is stressed that injudicious use of some of these methods is probably responsible for the frequent failures.

The general concensus is that carcinoma of the skin is probably best treated (1) by surgical excision, or (2) by irradiation, the choice of the therapy being dependent upon the following factors: 1) location of the lesion, 2) degree of extension, 3) previous therapy, and 4) the experience of the therapist.

Prognosis: Carcinomas of the skin have the best prognosis of all malignant tumors. The presence of metastatic lymph nodes lessens the prognosis, and recurrence following inade-

quate excision or irradiation have the poorest prognosis.

Melano-epithelioma—The clinical and pathologic features of 75 cases of malignant melanoma of the skin were recently reported. About 65 per cent of the cases had a pre-existing mole and in 25 per cent of this group the mole had been present since birth. Malignant melanoma is the most common malignant tumor of the lower extremities.

Indications of Malignant Change: Moles usually do not undergo malignant changes during childhood or adolescence. Some of the first signs indicative of malignant changes are (1) increase in size, (2) darkening of pigmentation, (3) surface ulceration, and (4) extension into surrounding tissue. It is thought that trauma may play an important etiologic role in the development of malignant changes. Therefore moles located in areas of constant irritation should probably be removed as a prophylactic measure. These sites are (1) the face (shaving), (2) neck (collar), and (3) abdomen (belt). Moles should be excised by sharp dissection so that adequate histologic examination can be made.

Treatment is Surgical: Treatment consists of radical excision of the lesion and radical dissection of the predictable or known lymph node-bearing areas or both. These tumors are extremely radioresistant and consequently irradiation is not indicated as a primary therapeutic procedure. Irradiation is also of doubtful value as a palliative measure, for it was noted that although there was marked local regression in some cases, this was followed by increased growth of the tumor, distant metastatic lesions, and death. Some of the reported cures of melano-epitheliomas by irradiation did not have pathologic confirmation, and it is likely that these lesions were probably not melano-epitheliomas.

Prognosis: The over-all prognosis is poor. A five-year survival rate has been reported of 19 per cent for all patients. However, about 50 per cent of the patients of the series reported were operable and for these the outlook is much more favorable with a five-year survival rate of 38 per cent.

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Tumors of the Nose and Paranasal Sinuses—The most common tumor of the nose and paranasal sinuses is the ordinary polyp, which is inflammatory in origin rather than neoplastic. Other benign tumors of this region are usually of connective tissue origin. Of these the most significant is the fibroma seen in the nasal cavity. These may grow to large size and produce marked obstruction of the nasal passages. They are usually found in the adolescent age group. Because of its large size, the tumor may cause pressure necrosis of the adjacent bony structures. Histologically the tumor is composed of vascular connective tissue. The treatment is excision and fulguration.

The malignant tumors are, in a majority of cases, squamous cell epitheliomas. However, about one-third are adenocarcinomas or sarcomas of the various types. The commonest sinuses to be involved are the antrums; a tumor involving the frontal sinuses is the meningioma. These slowly growing meningeal tumors erode the bone and invade the sinus cavity.

In general, the low-grade lesions are radioresistant and are consequently treated with surgical diathermy whereas the high-grade lesions are radiosensitive and are treated by irradiation.

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Tumors of the Nasopharynx—Of particular interest in this region is the lympho-epithelioma. This tumor constitutes about 10 per cent of the malignant lesions of the nasopharynx.

Pathogenesis: The tumor occurs in the region of the tonsil, the posterior nares, the orifices of the eustachian tubes and the roof of the pharynx. The epithelium of these parts may be squamous or transitional. Lympho-epithelioma is believed to be a highly malignant carcinoma originating from this epithelium; it imitates a lymphosarcoma. Of particular clinical interest is the fact that these tumors grow slowly at the primary site, but metastasize early to one or both sides of the neck.

Prognosis: They are extremely radiosensitive and the five-year survival rate following irradiation varies from 25 to 42 per cent. Since the so-called lympho-epithelioma is a carcinoma it is probably of no more than passing interest to retain the term "lympho-epithelioma." The tumor should be grouped with the carcinomas.

Tumors of the Larynx—Small nodular growths may occur in the true vocal cords. As they are frequently found in singers, public speakers, and school teachers, some relationship to excessive or unnatural use of the voice, or both, is suggested. They are small, elevated, and usually bilateral. Histologically, they are composed of a loose, vascular, organizing, inflammatory fibrous connective tissue covered by a thickened epithelium. Surgical removal under direct vision has been recommended so that the node may be removed clearly without damage to the cordal margin.

Carcinoma of the Larynx—About 2 per cent, 95 per cent of which occur in males, of all malignant lesions are carcinoma of the larynx. They are anatomically divided into two groups: (1) the intrinsic (vocal cords, ventricles, and subglottic regions), and (2) the extrinsic (upper surface of the ventricular bands, epiglottis, or its appendages and the postcricoid region). Their respective incidences are approximately equal.

Symptoms: They are almost always squamous cell epitheliomas and the malignancy is usually grade 2 or 3. The first symptom of the intrinsic type is, in most cases, hoarseness. In the extrinsic variety dysphagia of varying degrees is usually the first symptom; however, in 20 per cent of the extrinsic lesions a metastatic node is the first symptom and in this group there may be intractable pain due to compression of cranial nerves.

Survival Rate Low: About one third are operable and in this group the survival rate is higher than that following irradiation. It is stated that if a lesion of the vocal cord is 1.0 centimeters or less in diameter, surgical treatment brings a five-year survival rate of 92 per cent. About two thirds must be irradiated and the cure rate is extremely low. The complications of the intensive irradiation necessary are the usual causes of death.

Tumors of the Mouth—Cancer of the mouth constitutes about 4 per cent of all human cancer. About 90 per cent of these lesions are squamous cell epitheliomas. Carcinoma of the lower lip constitutes about one third of all carcinomas of the skin. The malignancy of most of the lesions of the lip and anterior two thirds of the tongue is usually grade 1 or 2, whereas the malignancy of most of those of the posterior one third of the tongue is grade 3 or 4.

Description: Leukoplakia in this region is definitely associated with development of squamous cell carcinoma. Grossly, the affected mucous

CLINICAL AND LABORATORY SUGGESTIONS

(*See pages* 364 *and* 365)

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membrane is whitish and thickened. The whitish appearance is the result of the development of a thick cornified anuclear layer on the surface. This is normally not present on a mucous membrane. The thickening is the result of epithelial hyperplasia and an inflammatory infiltration beneath the epithelium. Carcinoma, when it appears, develops from the hyperplastic epithelium. Leukoplakia tends to develop in multiple areas. Since such lesions are precancerous, these patients should have periodic investigations with eradication of the leukoplakia as it appears.

Diagnosis: It is stressed that carcinomas of this region are chronic and progressive. If patients can recall that the lesion has been present for several weeks or months and is steadily increasing in size, the diagnosis is most likely to be a malignant tumor. This can be attributed to the fact that parts of the mouth are comparatively insensitive and the lesion may become large before being noticed. Adequate biopsy specimens should be sent to a pathologist for definite diagnosis.

Treatment: Surgical removal or irradiation is the method of treatment, used alone or in combination. The type of treatment is determined by (1) the site and extent of the lesion, and (2) the prognosis.

Survival Rates: The following five-year survival rates in carcinoma of the mouth have been reported: (1) Lip, 70 per cent; (2) tongue, 28 per cent; (3) floor of mouth, 25 per cent; (4) mucosa of cheek, 29 per cent; (5) palate, 31 per cent; (6) gingival tissue, 26 per cent, and (7) tonsil, 18 per cent.

Epulis—A benign tumor occurring in children and young adults, an epulis arises from the periosteum of the deciduous teeth and usually develops between, or by the side of, the teeth. Only rarely does it develop in relation to the molars. The growth is outward and the tumor presents itself clinically as a broad-based, elevated, firm mass. The overlying epithelium is usually intact.

Giant Cells Revealed: Microscopic examination reveals multinucleated

giant cells in a fibrous tissue stroma. The number of giant cells is variable; however, in the typical case they are numerous. The tumor does not invade the bone.

Treatment: Surgical removal of the tumor, together with removal of the teeth in the region, and curettement of the overlying bony processes have been recommended. The patient should be observed frequently for a considerable period and if the growth recurs, it should be excised again and cautery applied.

Fibrous Type: A type of epulis in which no giant cells are seen is often called the fibrous type and does not respond to excision as readily as does the giant cell type.

Adamantinoma—A fairly common tumor of the jaw, adamantinoma is more common in the lower jaw where it usually occurs in relation to unerupted or malerupted teeth, especially the molars and cuspids. The tumor grows slowly and causes expansion of the jaw until only a mere shell of bone remains. Cyst formation may occur. This tumor, when located in the jaw, is usually benign; however, when found in the tibia it is frequently malignant and metastasizing. Histologically, a wide variation is presented. Treatment is surgical removal.

Tumors of the Salivary Glands—The most common tumors of the salivary glands, the so-called mixed tumors, occur in the parotid, submaxillary, and sublingual salivary glands and are also seen in the mouth, throat, upper lips, and lacrimal glands.

Definition: Mixed tumors have been defined as neoplasms of the orofacial region comprised of stroma of mucoid connective tissue, often undergoing cartilaginous transformation with groups of epithelial cells which may be either glandular or squamous. Because of a distinct variation in both the histologic picture and clinical course this group must be further subdivided into two types: (1) the typical mixed tumors, and (2) the cylindroma type of mixed tumor.

Histology: In a group of 81 tumors of the submaxillary gland an incidence of 18.5 per cent of the

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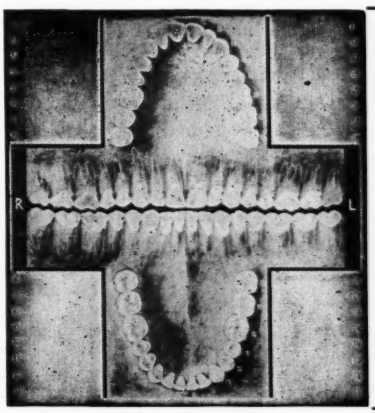

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cylindroma type was reported. Histologically, the cylindroma type of mixed tumor is composed of cylinders of epithelial cells in a connective tissue matrix. Enclosed within the cylinders of epithelial cells are cystic spaces filled with a mucoid material. There is a marked tendency to involvement of the perineural lymphatics.

Prognosis: Clinically, the cylindroma type offers a poor prognosis since there is a five-year survival rate of only about 50 per cent. Simple enucleation is followed by recurrence in about 85 per cent of cases whereas after radical resection the recurrence rate drops to about 40 per cent. Death is due to widespread metastasis. In the remaining, much larger group, the typical mixed tumors, there is a more hopeful outlook. A tumor of this type is slow growing. It may recur locally but rarely metastasizes.

Therapy: Complete surgical excision is recommended. Neither type is usually radiosensitive.

Classification: These tumors also occur in the upper lip, mouth, throat, and lacrimal glands. The tumors are classified on a histologic basis as cylindromas, mixed tumors, papillary adenocarcinomas, and solid adenocarcinomas.

Prognosis: In contrast to tumors in the salivary glands and elsewhere, the cylindroma type of mixed tumor far outnumbered the typical mixed tumor when it occurred in the nasal cavity and the antrums. When comparing the prognosis it was found that the papillary adenocarcinoma, although histologically appearing relatively benign, gave the poorest prognosis. The prognosis in respect to the remaining lesions varied from poorest to best, in the following order: (1) cylindromas, (2) solid adenocarcinomas, and (3) typical mixed tumors.

Mikulicz Disease and Mikulicz Syndrome: Both of these conditions are characterized clinically by symmetric enlargement of the salivary glands with or without similar involvement of the lacrimal glands. Histologically, in both entities there is a profuse overgrowth of lymphocytes with only scattered remnants of glandular tissue remaining.

Distinction Difficult: It is not possible for the pathologist to distinguish between the two by the microscopic picture presented in these tumors. The distinction must be made by clinical and laboratory investigation of the reticulo-endothelial system. When the involvement of these glands is a part of a generalized reticulo-endothelial malignant disease such as leukemia or malignant lymphoma, then the term "Mikulicz syndrome" is applied.

Lesion Responsive to Irradiation: If a thorough clinical and laboratory study of the reticulo-endothelial system reveals no evidence that the system is involved, the term "Mikulicz disease" is applicable. The condition in the latter instance is a benign localized lesion of unknown cause and responds well to small doses of irradiation.

Adapted from *The South Dakota Journal of Medicine and Pharmacy.*

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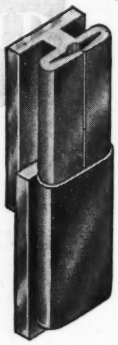

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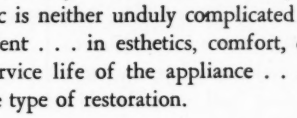

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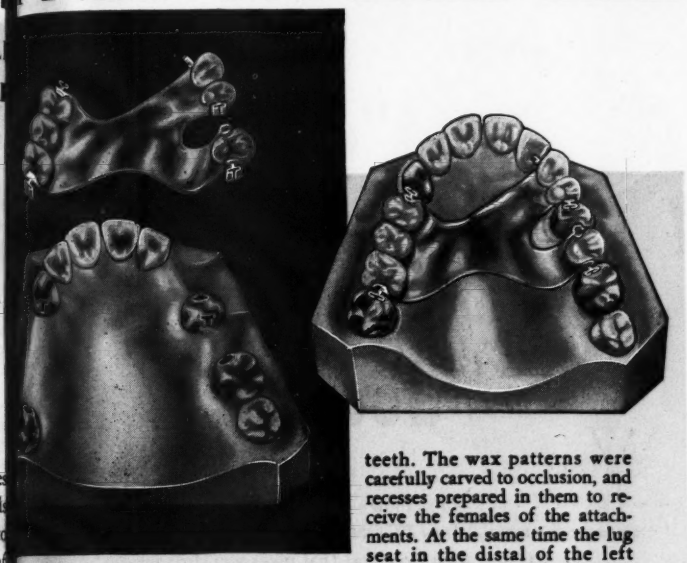

eplacement of the missing teeth on upper was esthetically accomished with a Movable-Removable idge. Efficient function was restored h maximum comfort to the patient. utment and tissue health was maintned with the application of sound nciples to the design and construcn of the case. This is, in fact, an l restoration from both the operar's and patient's viewpoint.
The abutments are the upper right spid and second molar, and the left cond bicuspid and first molar. The iginal plan for the abutment preparons was made on an accurate study del, assuring sufficient space in the rings to accommodate the females thin the normal circumference of the teeth. The wax patterns were carefully carved to occlusion, and recesses prepared in them to receive the females of the attachments. At the same time the lug seat in the distal of the left second bicuspid was prepared, ensuring its parallelism with the attachments. The three-quarter crowns in the cuspid and bicuspid and the full crowns on the molars were cast in Ney-Oro B-2.

In this case a single wide bar across the palate effectively distributed the load between abutments and tissues. Thus the abutments alone were not required to carry all of the stresses resulting from the forces of mastication. The four Ney Chayes Attachments plus the accessory lug in the bicuspid esthetically provide retention, at the same time allowing the minute movements necessary for preservation of the abutments and tissues in sound health.

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toms or systemic manifestations unless the lower jaw becomes so large that it prevents closure of the mouth and interferes with respiration and speech. 4. Roentgenograms show extensive multilocular rarefaction and pronounced expansion of the mandible. 5. The maxilla is also greatly expanded but the rarefaction is diffuse rather than multilocular. 6. No other bones are affected. 7. Near puberty, the facial appearance improves, with progressive decrease in the size of the jaws; by middle age the roentgen and facial abnormalities are minimal or absent.

Variants of Fibrous Dysplasia

Tissue specimens from the jaws showed fibrous tissue containing varying numbers of giant cells, and the histologic picture was identical with that of fibrous dysplasia. Various diseases of the jaws have been called (1) fibrous dysplasia, (2) fibrous osteoma, (3) osteofibroma, and (4) ossifying fibroma. Most of the recent writers agree that this disease may be regarded as a variant of fibrous dysplasia.

The authors of the present report believe that despite the histologic similarity of fibrous dysplasia and familial fibrous enlargement of the jaws these conditions should be regarded as separate entities.

Adapted from Medical Literature Abstracts, *Journal of the American Medical Association* **146**:66 (May 5) 1951.

Familial Fibrous Swelling of Jaws

THE FAMILIAL occurrence of painless enlargement of the jaws was first reported by Jones in 1933 in three siblings, 6, 5, and 4 years of age. Later, x-ray studies on the same family revealed that the condition was due to multiple dentigerous cysts involving the entire upper and lower jaws and accompanied by chronic enlargement of the lymph nodes in the submaxillary regions. The authors[1] of the present report observed two families, some members of which exhibited clinical and roentgen signs similar to those in the cases described by Jones.

Characteristics

1. The disorder is characterized by massive swelling of the cheeks and jaws beginning during the first three years of life. 2. Dentition is defective. 3. There are no associated symp-

[1]Caffey, J., and Williams, J. L.: Familial Fibrous Swelling of Jaws, Radiology **56**:1 (Jan.) 1951.

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